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XLVI

THE DEVELOPMENT OF THE FLOUR-MILLING INDUSTRY IN THE UNITED STATES

WITH SPECIAL REFERENCE TO THE INDUSTRY IN MINNEAPOLIS

THE DEVELOPMENT OF THE FLOUR-MILLING INDUSTRY IN THE UNITED STATES

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BY

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PREFACE

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INTRODUCTION

It would be difficult to find in the economic history of the United States another industry so important from the point of view of health and well-being as flour-milling. Certainly not one has a longer history, for the first American manufacturing establishments were devoted to grain-grinding. Higher standards of living and increasing variety in our foods have made us lose our sense of the importance of the most indispensable of our products.

Relatively, flour-milling has lost importance in recent years. The Census of Manufactures of 1923 shows the industry ranking seventh in cost of materials, fourteenth in value of products, thirty-ninth in value added by manufacture, and fiftieth in number of wage-earners. On the whole the industry has grown slowly, hardly keeping pace with the advance of population and of wheat-growing.[1] The present annual production of flour is somewhat in excess of 125,000,000 barrels of which over seven eighths is wheat flour.

The Census of Manufactures taken in 1919 enumerated 21,135 flour-mills and gristmills. About half of these are small custom mills grinding the farmer's grain for a fixed toll and probably devoting most of their time to producing feed for cattle. Collectively they do not use one per cent of the wheat ground in the country. The other half are classified as merchant mills since they purchase grain and sell the finished products. But of these 10,708 merchant mills over half ground less than a thousand barrels each, and collectively they produced less than a fourth of the flour milled.[2] It is the remaining 4692 mills, each grinding more than a thousand barrels of flour annually, with which we are mainly concerned.[3]

Looking at the industry as a whole, we see a somewhat paradoxical situation. On the one hand there is a tendency to dispersion, on the other to concentration. Because the processes are quite simple, the machinery nearly automatic, and the capital investment relatively small, there are thousands of mills scattered over the country. Every State in the Union has them. Hence, it is difficult to study the industry as a whole. On the other hand, we find that the bulk of the wheat flour is produced in a few States. In 1921 flour-mills located in Minnesota produced one fifth of the total output of the entire country, those of Minnesota and Kansas combined, three eighths, and those in Minnesota, Kansas, New York, and Missouri, one half of the total.[1] Not only has the industry tended to localize itself in a few States, but it has tended also to concentrate in the hands of a few large companies operating on a very large scale. In 1921, for example, five companies, operating forty-nine mills, produced nearly a fourth of the total output,[2] and ten companies control probably half of the milling capacity of the country. According to the Federal Trade Commission: 'The crowding of consumers into limited areas incidental to the great industrial development of the country has created a situation in which a demand for standardized brands of wheat flour has been developed. Such flour can be produced successfully only by milling concerns of large size, whose wheat supply enables them to maintain the quality of their flour practically unchanged from year to year'.[3] And lastly, we have a concentration of milling capacity at certain favorably located centers. In 1922, when the flour output of the United States was estimated at 125,000,000 barrels, one fifth of the total was produced in the three leading milling centers.[4]

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[1] Federal Trade Commission, *Report on Commercial Wheat Flour Milling* (1920), 7.

[2] *Fourteenth Census*, x, 102, 114.

[3] *Ibid.*

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[1] Federal Trade Commission Report (1924), *Minneapolis Journal*, May 5, 1924.

[2] *Ibid.*

[3] Federal Trade Commission Report on *Commercial Wheat Flour Milling* (1920), 7–8.

[4] Minneapolis, 15,643,000; Buffalo, 6,709,000; Kansas City, 4,708,000. *Millers' Almanack* (1923), 195.

The *Census of Manufactures* (1925) showed that the mills with over a

It is the rivalry between these large centers of flour production which has been the outstanding characteristic of the milling history of the United States. The rise and decline of milling centers is but the surface indication of the workings of fundamental economic forces. The competition of individual millers and milling companies merges into the larger competition of milling centers and this into the competition of the industry of nations and continents. And back of it all are the geographic, climatic, and racial factors, conditioning the supplies of raw materials, labor, capital, and business ability.

In the beginning the center owes its rise mainly to physical advantages. There is a local market, a supply of raw materials near at hand, and cheap power also, usually waterpower. An entrepreneur, more enterprising or more ambitious than his neighbors, sees the opportunity and starts a mill. His success encourages others to do the same and thus a milling center gets its start. To grow to national or international importance, however, a center must have additional advantages. It must have superior transportation facilities to the great consuming centers, both at home and abroad, since large-scale production, with all that it implies in technical efficiency, is impossible without a widespread market. Wide markets and large production are obviously impossible unless raw materials can be secured from a large area. Since capital and labor are comparatively mobile, the center which has the other advantages which we have enumerated can usually get what it needs of both. Labor, in any case, is a relatively unimportant factor in the milling industry because the machinery is so nearly automatic. The determining factor, in most cases at least, seems to be a superiority in product. Either because of a superiority in raw materials or in technical methods, or both, this center acquires a national and international reputation for its flour.

million barrels annual capacity were 4.4 per cent of the total number, but they employed over 50 per cent of the wage-earners and produced 63.3 per cent of the total value product.

In the course of time other advantages of a more or less monopolistic type may develop. The wheat and flour tariff rates, for example, may favor certain centers and injure others. It is possible that one center, as a result of a persistent, well-directed, widespread advertising policy, may create a demand for its products which will accept no substitutes, and this is in the nature of a monopoly advantage. Again the center may be able to control certain marketing facilities such as exchanges, line-elevators, etc., which will give it an advantage over all rivals. Most important of all is the advantage which may be obtained from unduly favorable freight rates. Doubtless differences in freight rates not based on more fundamental advantages will tend to disappear in the long run. But the transportation business is not a competitive one. Rate-making bodies move slowly. The rate fabric is such a delicate one that the authorities fear to tamper with it unduly. There is, moreover, the prejudice against endangering vested rights. Accordingly, an advantage in transportation rates may often continue for a long time because of the mere difficulty of removing it.

The rate advantage does tend to disappear, nevertheless, unless founded on natural (geographic) advantages. There follows a period of decline which may be accelerated by a variety of causes. Among these we may note a decline in the quality or quantity — or both — of the raw materials from the tributary area. A shift in markets may cause the center to lose trade in regions in which it has been dominant heretofore. Thus it may lose its inter-metropolitan trade while still holding its intra-metropolitan area. Superiority of product may disappear as other centers acquire equal or superior raw materials and technical methods.

The advantages which gave the center a start in milling are about the only ones that are likely to prove permanent. The local market, the local supply of raw materials and cheap power remain even after the position of leadership has been lost. Hence, when the center declines in importance, the industry does not utterly decay and disappear. Almost all the centers to be described in the following pages have passed their zenith. But, except in a few cases, they are still important in the industry, having lost ground relatively rather than absolutely.

While the rivalry of milling centers forms the central theme of the book, it is not, of course, the whole story. Methods of milling have changed greatly, particularly in the last sixty years. The advance of the physical sciences has left its mark on this as on other industries. New varieties of wheat, new food products, and competing food industries have also caused great changes. Problems of labor relations, of relations with sequence-industries and with the Government have become very important. Most important have been the changes in the organization of the industry particularly on the marketing side. We have attempted, therefore, to give consideration in what follows both to the history and development of the industry and its present position and problems.

THE DEVELOPMENT
OF THE
FLOUR-MILLING INDUSTRY
IN THE UNITED STATES

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CHAPTER I

THE BEGINNINGS OF WHEAT-GROWING AND FLOUR-MILLING IN COLONIAL TIMES

BEGINNINGS are always difficult to deal with satisfactorily. Sources of information are few and provokingly vague in matters of detail. This is the case in the history of flour-milling in the United States in colonial times. The story is a long one and great gaps are bound to appear in any attempt to trace connected development. Nevertheless, it seems worth while to gather up the available bits of information for this earliest period of our milling history, not merely for the sake of completeness, nor simply to provide a starting-point from which to measure future growth, but, as will appear later, because most of the forces, which were important in later milling development, arose in this germinal period. In doing this it seems best to deal with each geographic section separately. We begin with the New England colonies.

I. NEW ENGLAND

The Plymouth settlers brought with them their English wheat, as well as rye, oats, and barley, and planted it beside the Indian corn.[1] In spite of early crop failures, they persisted in planting wheat until it became — if not the chief food crop as in England — at least a very important one.

[1] Bradford, *History of Plymouth Plantation* (Original Narratives of American History Series), 115-16, 139.

So, too, the first settlers in Massachusetts Bay Colony brought over English wheat.[1] In that colony production increased so slowly that the General Court was forced to limit consumption in 1630, in 1634 and again in 1641.[2] Wheat-growing seems to have become quite general after 1641 with the introduction of the spring-sown varieties. Much rye was grown also, as it was found to be the most dependable grain crop.[3]

By 1660, the New England colonies seem to have had a small surplus of wheat. In that year John Winthrop, Jr., wrote from Hartford that 'it is not now as in our beginnings, when we were necessitated to bring provitions sufficient for a long tyme, but now the country doth send out great store of biscott, flower, peas, beife, porke, butter, and other provisions to the supply of Barbados, Newfoundland and other places, besides the furnishing out many vessells and fishing boats of their owne. . . .' [4]

The spread of grain-growing made mills of some kind almost a necessity. The first of these, so far as is known, is one mentioned in Governor Winthrop's *Journal*. On August 14, 1632, he records that 'the windmill was brought down to Boston because where it stood near Newtown [Cambridge] it would not grind but with a westerly wind.' [5] As population grew, more efficient types of mills proved necessary. In 1643 the exclusive right of grinding corn for the public in Boston was offered to any one who would build a tide-mill.[1] A tide-mill was a water-power mill so situated that when the tide flowed in, it ran into the mill-pond and filled it. At the ebb the imprisoned waters flowed out through the mill-race and thus provided power for five or six hours a day.[2] Such mills seem to have been fairly common on the coast of New England. The settlers of the interior, lacking this source of power, had to utilize the smaller streams.

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[1] Massachusetts Bay Company, *Records*, I, 24, 392.

[2] *Ibid.*, I, 77, 140, 337. Their resolution of 1641 reads: 'Forasmuch as it appeareth to this Court that wheate is like to bee a staple commodity and that a ship is with all convenient speede to bee set fourth and fraited with wheate for the fetching in of such forraine commodities as we stand in need of, it is therefore ordered, that after the last day of this psent 8th month, no baker, ordinary keeper, or other pson, shall bake, to sell or set to sale, any bread or cakes made of wheate meal . . . .'

[3] Carrier, *Beginnings of Agriculture*, 147.

[4] Massachusetts Historical Society, *Collections*, 5th Series, VIII, 65.

[5] Winthrop, *Journal History of New England* (Original Narratives of American History Series), I, 90. Another windmill was built at Boston, and one at Charlestown in 1636, and one at Scituate in 1637. Bishop concludes that windmills were most numerous in the older parts of Massachusetts and in Rhode Island though found in all parts of New England. Bishop, *History of American Manufactures*, I, 116–19.

The first water-power mill in New England is said to have been built at Dorchester in 1634.[3] In the same year a mill was built at Roxbury, and in that year, or the following, mills were set up at Lynn and at Watertown. The Watertown mill had an artificial canal or mill-race which was the first of its kind in the country. In 1636 water-mills were built at Salem, Ipswich, and Newbury. Probably by 1700 there were few New England villages that were without a gristmill of some kind.[4]

Many of these mills were erected by the colonial leaders to fulfill a public need rather than for profit-seeking purposes. Thus John Winthrop, Jr., Governor of Connecticut, seems to have erected one of the first mills in that colony in 1650. Nicholas Easton, afterwards Governor of Rhode Island, built a windmill at Newport in 1663, and Governor Benedict Arnold's stone mill, the tower of which is still standing, was erected at Newport in 1678.[5] Sir William Pepperell also was owner of several mills on the Saco and the Piscataqua Rivers.[1]

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[1] Massachusetts, *Acts and Resolves*, VIII, 306.

[2] Kalm, *Travels into North America*, I, 236, description of a tide-mill on Staten Island.

[3] Massachusetts Bay Company, *Records*, I, 114. In April of that year, it is recorded that 'Mr. Israel Stoughton hath liberty granted to him to build a myll, a ware, and a bridge over the Neponsett Ryver. . . .'

[4] Manchester, 'First Mills in the American Colonies,' *Northwestern Miller*, January 13, 1926, p. 128. Weeden, *Economic and Social History of New England*, I, 102–03; Goodwin, *The Pilgrim Republic*, 161.

[5] Rhode Island, *Colonial Records*, I, 62; II, 129. Wheat, barley and oats are said to have been relatively unsuccessful crops in Rhode Island, rye being the principal grain crop. Carrier, *Beginnings of Agriculture*, 192.

Some of these early mills survive to this day, but, in general, they were too crudely constructed to last. Lack of capital and perhaps of technical skill prevented the utilization of the larger streams. Often the mills had to be moved after a few years because the streams on which they were located had dried up with the clearing of the forests. In many cases they operated only intermittently shutting down when the water in the mill streams was low.[2] In the autumn of 1773, for example, the mills about Saybrook, Connecticut, were unable to grind grain for nearly four months because of the extreme drouth, so that the inhabitants of the district were forced to carry their grain across the Sound to the windmills on the Long Island shore.[3]

The surplus of wheat and flour, of which Winthrop boasted in 1660, seems to have been of short duration. In 1662 the Massachusetts General Court, 'being informed by the deputyes of the severall townes that bread corne is scarce amongst the people,' prohibited the export of wheat and flour.[4] This may have been, as the context indicates, because of an influx of immigrants, but there are also indications that the wheat was failing. John Hull records in his *Diary* in 1665, 'the wheat generally blasted and the blast this year took hold of Conecticot and New Haven.'[5] 'Our old husbandmen thought it a meldew,' John Winthrop wrote in 1668,[6] 'others that the originall defecte is in the roote, . . . It is observed that summer wheat is most subject to the hurt though much winter wheat hath been spoyled also.'

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[1] Manchester, 'Some Famous Millers,' *Northwestern Miller*, March 12, 1924, p. 1093.

[2] Kalm, *Travels into North America*, I, 134.

[3] *Patent Office Reports*, 1850, part I, 453–54. Memorial of John Shipman of Saybrook to the General Assembly of Connecticut.

[4] Massachusetts Bay Company, *Records*, IV, 43.

[5] *The Diaries of John Hull*, American Antiquarian Society, *Transactions and Collections*, III, 208, 213, 218.

[6] Massachusetts Historical Society, *Collections*, 5th Series, VIII, *The Winthrop Papers*, 122–23. The use of the word 'blast' indicated the general belief that the disaster was a judgment from Heaven. Hull

The blast seems to have been well known from that time on. In the following century the opinion came to be held that the barberry bushes were somehow responsible. Dwight stated that 'its blossoms which are very numerous and continue a considerable time, emit very copiously, a pungent effluvium, believed to be so acrimonious as to injure essentially both these kinds of grain [wheat and rye].'[1] Several colonies legislated against the barberry, the Massachusetts Legislature of 1754–55, for example, ordering all such bushes in the province to be destroyed.[2] Efforts were made to secure earlier maturing wheats because it was observed that these escaped the worst of the disease.[3] In many towns they turned definitely from spring to winter wheat.[4] But the blast was never conquered and it seems to have been an important cause of a general decline of wheat-growing in New England.[5]

The chief cause of that decline, however, was the competition of better wheat lands in other regions. In early New England, as in most pioneer communities, wheat was the chief 'money crop' because of its high specific value, good keeping qualities, and comparative ease of transportation. Hence it was universally grown. But as settlement spread

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(*Diaries*, 208) refers to Haggai 2:17 and Amos 4:9 in this connection, and Winthrop writes: 'If it be from the aire or celestiall influences, or such like universall causes, what remedy but from heaven? (Nil nisi vota supersunt.)'

[1] Dwight, *Travels in New England and New York*, I, 381–82.

[2] Massachusetts, *Acts and Resolves*, III, 797–98, Province Laws.

[3] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 95.

[4] *Ibid.*

[5] The blast is clearly identical with the rust which in several varieties attacks wheat to-day. Modern opinion justifies the legislation against the barberry bushes, not, of course, on the grounds stated by Dwight, but because these bushes act as host to the parasites which attack the wheat during the growing season.

westward, certain regions were found to be specially adapted to wheat-growing and regional specialization began. The Connecticut Valley was the first region to develop a large surplus. During the seventeenth century it was the best grain-producing region of New England. The older settlements nearer the coast could not compete with the Connecticut Valley farmers, for their initially poorer soils had been exhausted by wasteful methods of cultivation. So they shifted to other crops. After 1750 Boston regularly imported foodstuffs from New York, Philadelphia, and Baltimore and by 1800 even the Connecticut Valley was importing its wheat and flour.[1]

The Massachusetts prohibition against the importation of 'wheat, bisket and flower' was removed in 1675 and the exportation of all provisions except 'fish and mackerell' was prohibited.[2] The laws of 1742–43 contained a provision for the appointment, at all the principal ports, of measurers of grain, from which we may infer the growing importance of foodstuffs imports.[3] A few years earlier, public granaries had been established in Boston.[4] The Maryland exports to Massachusetts and Rhode Island in the years 1756–66 show a preponderance of unground grain, suggesting that the New England mills were still able to supply the domestic market.[5] They had long since ceased to export flour to the West Indies, however, and the flour exports of the later years were simply re-exports of products of the Middle and Southern Colonies.

In 1761–62, Massachusetts attempted to revive both wheat-growing and flour-milling by a system of bounties, but after four years' trial it was decided that the law was a failure and it was repealed.[1] Doubtless a thoroughgoing protective policy might have raised the returns to the domestic producer sufficiently high to justify the increased expense which was necessary (in the form of fertilizers, better cultivation, etc.) to enable the New England farmers to grow wheat successfully on their poor and worn-out soils. But, as John Adams pointed out, 'that expense will never be repaid while wheat, rye and corn have such a formidable rival in commerce.' [2] As her population increased and she became more industrialized, New England became increasingly dependent on other sections for her foodstuffs, which condition has lasted down to our own day. But whereas in the colonial period she imported wheat and ground it herself, in the next period her mills declined and disappeared so that she became an importer of flour.

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[1] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 92, 142–43; Weeden, *Economic and Social History of New England*, II, 591.

[2] Massachusetts Bay Company, *Records*, v, 65 (November 3, 1675).

[3] Massachusetts, *Acts and Resolves*, III, 13.

[4] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 142–43.

[5] *Annapolis Port Records.* Maryland Historical Society.

II. New York and New Jersey

The first considerable center of the flour trade and flour manufacture in this country seems to have been New York City. Manhattan, as described by its early inhabitants,[3] was but a barren and rocky island, but the adjacent country was capable of producing large crops of grain. Wheat grew particularly well on the 'flats' of Esopus, and from the early years was the chief grain crop.[4] Streams available for water-power were lacking, but there were many places where tide-mills could be easily erected, especially on the Long Island shore. At least two such mills seem to have been erected during the Dutch occupation and four others before 1710.[5]

As one might expect, the Dutch settlers displayed an especial fondness for the windmill and such mills seem to have been very common, especially on Long Island. We are familiar with the type from pictures and descriptions: The octagonal tower thirty feet or more in height, the four great arms whose spreading sails reached nearly to the ground, the top of the tower movable so the sweeps could be turned to the wind. The wheat was brought to the mill in sacks, raised to the top story, screened, i.e., cleaned of gravel and weeds, and then dropped to the single set of millstones which ground slowly and with frequent pauses as the wind died down. After grinding, the meal was passed through a single bolter and delivered to its owner; for most of these were toll mills doing custom grinding only.[1] In the Hudson Valley and the eastern end of the Mohawk, preference was given to water-mills, and even before the English conquest there were many water-power mills scattered through the valley.[2]

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[1] Massachusetts, *Acts and Resolves*, IV, 527–28 (Province Laws, 1761–62); IV, 858–59 (Province Laws, 1765–66).

[2] Quoted in Bidwell and Falconer, *History of Agriculture in the Northern United States*, 236.

[3] New York City, *Minutes of the Common Council*, I, 47. See also the 'Journal of Lord Adam Gordon,' in Mereness, *Travels in the American Colonies*, 413–15.

[4] New York Historical Society, *Collections*, Second Series, I, 157.

[5] Field, *Brooklyn and Its Vicinity*, 67–72.

In New York City the first mill seems to have been a small 'horse-mill' built in 1626.[3] Before 1633, a windmill was erected in what is now Battery Park and several others were built in other parts of the island during the Dutch rule.[4] Exportation of flour seems to have been small and intermittent during that period though wheat seems to have been exported as early as 1644,[5] but a considerable export of flour was developed soon after the English occupation. In 1674 the Mayor and Aldermen advised the Governor of the Colony 'That it is absolutely necessary for good and reputacon of the countrey, That floure be viewed by a sworne Officer, and none suffered to be shipped abroad but such as shall be fine bolted . . .' and marked with the town brand.[1] In 1686 the flour barrel was placed opposite the beaver on the city coat-of-arms, indicating equal importance for the prosperity of the city.[2] The growth of the city's flour trade seems to have been encouraged by a monopoly of the bolting of flour which was granted to the city by the Dutch West India Company and confirmed by the English Governor in 1665.[3] This grant seems to have had the double purpose of concentrating the flour trade where it would be easy to regulate and of building up the trade of New York City.

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[1] *Northwestern Miller*, June 18, 1880, p. 393; description of one of these Long Island mills.

[2] Bishop, *History of American Manufactures*, I, 119, 135. See the *Van Rensselaer Bowier Manuscripts*, 57, 297, 328, etc., for the first mills built in the Albany region.

[3] *Documentary History of New York*, III, 42.

[4] New York, *Colonial Documents*, I, 299.

[5] Father Isaac Jogues speaks of three ships loading wheat at one time in 1644. *Documentary History of New York*, IV, 22–24; New York, *Colonial Documents*, II, 769.

As time passed, this monopoly began to meet considerable opposition particularly from the Albany merchants who wished to ship their flour directly to the New England towns. In 1684 they appealed to the Governor and Council for a repeal of the bolting monopoly, but without success.[4] The Governor referred the matter to the Duke of York's Commissioners, but they passed it back to him to settle, 'alwayes takeing care of the interest and advantages of your city of N. Yorke, that being the Staple of your trade, and indeed the key of your Countrey.'[5] Yet the law does not seem to have been well enforced.[6] The planters throughout the province are said to have set up bolting machines in defiance of it, and in 1694 induced the legislature to repeal it.[7]

The New York City merchants were not satisfied, however, and tried to get the bolting monopoly restored (1698). Under it New York City 'was the granary of America, there never being less than forty or fifty thousand bushels of wheat in store for the supply of any exigency . . . but since they have been deprived of that privilege there hath been scarcely one thousand bushels in store to supply the daily necessity of the people with bread.'[1] Further, they claimed that the country people were being injured, as well as themselves, in that their flour was falling in price in the West India market; 'for whereas it used to bring the highest price, now it is the lowest.'[2] And Governor Cornbury in his report to the Board of Trade rather supported this view. The repeal of the Bolting Act was, he thought, a blow to the trade of the province. 'Till that time, nobody was permitted to bolt but the Citizens of New York; then the Bolters were under rule, proper Officers being appointed to view all the flower that was Exported, so that no bad commodity was suffered to go out. But in that year [1694] an Act of Assembly was passed whereby all persons in the Country as well as the City were permitted to Bolt; By which means two great Inconveniences hapned, one (which is the greatest) is, that the Commodity is vitiated, for the Country Bolter being under no rule or Check, does not care what the Commodity is, so it pass out of his hands; so that he very often mingles Indian Corn flower with his Wheat flower; this being discovered in the West Indies has so cried down our flower that the Pennsylvania flower sels for three shillings the hundred more than ours; Whereas the New York flower used formerly to exceed the Pennsylvania flower one and sometimes two shillings the hundred. . . . The other is that the Country Bolter ingrosses all the Corn of the County where he lives, And there being Bolters in almost every County, it is very difficult for the City Bolters to get corn to carry on their Trade; The Consequence of which is that the Bolters remove into the Country; if they remove, the Coopers must remove too, for they will find no work in the city . . . by which means, the City will in some years be unpeopled.'[3]

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[1] New York, *Journal of the Legislative Council*, III, part 2, p. 3.

[2] *Documentary History of New York*, III, 377.

[3] New York, *Colonial Documents*, III, 338.

[4] New York, *Journal of Legislative Council*, V, 62.

[5] New York, *Colonial Documents*, III, 351.

[6] New York City, *Minutes of the Common Council*, I, 310–12.

[7] New York, *Colonial Documents*, IV, 461.

When other measures failed, the New York City Council in 1700 tried to coerce the country bolters by imposing a tax on all country-bolted flour coming into the city, which so angered the country members of the Assembly that they refused to vote any appropriations until the ordinance was recalled. This the Governor (the Earl of Bellomont) persuaded the City Council to do.[1] After that, the demand for a restoration of the Bolting Act was dropped. Instead the city merchants began to advocate a State system of inspection to replace the local one. Governor Cosby recommended such a system in 1734 and in 1741 Lieutenant Governor Clarke urged again: 'You cannot be too careful to preserve by good laws the reputation of bread and flour, the staple commodities of the province. . . .'[2] Though the law was passed, complaints continued. In 1750 the Grand Jury of New York City presented a petition and remonstrance to the Assembly. 'Great and heavy complaints' had been made in the West Indies as to the quality of New York flour, not only Pennsylvania, but even New Jersey flour being preferred to it. Hence they asked for a revision of the inspection laws and this was granted.[3]

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[1] New York City, *Minutes of the Common Council*, II, 36 ff.

[2] *Ibid.*

[3] New York, *Colonial Documents*, V, 57.

The inspection system seems to have been fairly successful from this time on,[4] and it was gradually elaborated. At first it seems to have been confined to preventing adulteration and short weights.[5] In a report in 1768 a committee of the Chamber of Commerce suggested several changes: (1) The flour should be graded as to quality, as well as to its merchantability. The inspectors should consider not only the color and texture of the flour 'but should carefully examine (either by mixing up a little of the flour into a cake and baking it, or by some other effectual experiment) whether it has not been injured by being ground too close, or in some other way so as to prevent its rising and making light, white, bread. . . .' (2) That the barrel ought to contain not only the mark of the inspector but the name and address of the manufacturer. (3) The inspection should be improved by centralizing responsibility in one inspector. As it was, there were several independent inspectors competing for fees and hence afraid to grade each lot of flour strictly on its merits.[1]

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[1] New York, *Colonial Documents*, IV, 811–12.

[2] New York, *Journal of the General Assembly*, I, 654, 807; *Messages of the Governors*, I, 302.

[3] New York, *Journal of the General Assembly*, II, 294–96.

[4] New York, *Messages of the Governors*, I, 530. Lieutenant Governor DeLancey argued in 1753 that the success of the flour inspection was grounds for extending the system to include beef, pork, and other commodities.

[5] Stevens, *Chamber of Commerce Proceedings*, 17.

Complaints against the inspection system did not cease with the elaboration of the system, for the competition of Pennsylvania flours continued to be severe. However, in 1770, a member of the Chamber of Commerce suggested another possible cause for the inferiority of New York flour. Whereas most of the Pennsylvania millers were said to use imported French millstones, 'there is scarce a single pair of them employed by any miller in this colony.' He proposed, therefore, that they import buhr-stones from France and sell them at cost to New York millers. However, he too proposed changes in the inspection system. There should be a law protecting the flour in transit and a law requiring standard-sized barrels as in Pennsylvania. The inspectors should grade the flour not only as to color and texture but as to grinding. The flour should be 'lively' and rise well in baking.[2]

The parallel development of inspection systems in Pennsylvania and in Virginia, will be considered presently. The constant complaints of the New York merchants indicate a realization that they were losing ground before Philadelphia competition. Philadelphia had in fact become the leading flour center by 1750 and New York had to be content with second place.

Yet the trade of New York was growing absolutely if not relatively. Before 1700 their flour trade could not have been very large if the area from which supplies were drawn was no larger than is implied in a petition by the Governor and

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[1] Stevens, *Chamber of Commerce Proceedings*, 30.

[2] *Ibid.*, 110–12.

Council to the King in 1691. In this it is stated that New York City 'is scituate upon a barren island . . . and hath nothing to support it but the trade which chiefly flows from flower and bread they make of the corne the west end of Long Island and Zopus produceth, which is sent to the West Indies, and there is brought in returne from thence amongst other things, a liquor called Rumm, the duty whereof con siderably encreaseth Your Majestie's revenue. . . .' [1]

Undoubtedly they were also getting wheat all along the Hudson River, but in this area they were compelled to meet the competition of the Boston merchants who drew away the wheat supplies from the New York mills (with clipped coin, the New Yorkers said [2]), and so they urged that this was a great detriment to the city, 'leading to the impoverishing and destruction of numbers of people, viz., Boatmen, Millers, Bolters, Bakers, etc.,' who otherwise got a livelihood and maintained their families out of this trade. They therefore petitioned the Assembly (1691) that no wheat should be allowed to be exported except to the Madeira Islands only.[3] Governor Cornbury recommended this in 1705, but it does not seem to have passed the Assembly.[4]

By 1750 New York City had become the marketing center for a considerably larger area. Wheat and flour came not only from the adjacent counties but from the whole Hudson Valley, the eastern end of the Mohawk Valley, western Vermont, and even from Virginia and Maryland.[5] From New Jersey came a little wheat but more flour, for that colony had made rapid progress in milling. In the beginning the flour had actually been manufactured in New York City, or at least the finishing processes were carried on there. At the end of the colonial period the manufacture of the flour had been moved out into the hinterland and the city's relation to the trade became a purely commercial one. Relatively little flour was manufactured there, but much was sold and exported.

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[1] New York, *Colonial Documents*, III, 797.

[2] *Ibid.*, V, 57 ff. Lord Cornbury to the Board of Trade July 1, 1708.

[3] New York, *Journal of the General Assembly*, I, 17.

[4] New York, *Messages of the Governors*, I, 116.

[5] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 138–39.

There was a similar growth in the area of the market to which the flour was shipped. As early as 1648 the Dutch settlers were petitioning to be allowed to send fish, flour, and country produce to Brazil.[1] How large a surplus there was at this time we do not know, but in 1678 Governor Andros estimated that there was 60,000 bushels of wheat available for export annually.[2] After 1700 this increased greatly. By 1723 flour and other provisions were being shipped to Barbados, Montserrat, St. Christopher's, Nevis, Antigua and Jamaica in the British West Indies, to Surinam and Curacao in the Dutch possessions, and the Danish island of St. Thomas.[3] Curacao and Jamaica took large supplies not only for their own needs but for reshipment to the Spanish possessions. But Barbados was the principal market, 'Provisions being carried there not only for the supply of that Island but likewise for transportation to the Spanish coast while the Assiento Factors were settled there and to the French islands. . . .'[4] By this time, too, wheat and flour were being carried to the countries of southern Europe, Portugal especially, and from thence to France.[5] Gradually there was built up a considerable trade with the Madeira Islands, Teneriffe, and the Spanish ports of the Bay of Biscay.[6] Much of this trade was extremely fluctuating, being dependent on a condition of scarcity in Europe and handicapped by distance and lack of knowledge of market conditions.[7] Lastly, there were always some shipments to other continental colonies. Said Governor Colden in 1723: 'Several of our

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[1] New York, *Colonial Documents*, I, 215–16.

[2] *Ibid.*, I, 88.

[3] *Ibid.*, V, 55 ff.

[4] *Documentary History of New York*, I, 714.

[5] *Ibid.*

[6] *Ibid.*, I, 761.

[7] *Ibid.*, I, 722–24.

Neighbors upon the Continent cannot well subsist without our Assistance as to Provisions for we yearly send Wheat and Flour to Boston and Rhode Island as well as to South Carolina tho not in any great quantity.'[1]

Much of the flour marketed in New York City came, as has been said, from New Jersey, particularly from the region about New Brunswick,[2] for East Jersey had no port of its own up to 1680 at least.[3] A specialization of wheat-growing, in which New Jersey led all the colonies, accounted for a considerable milling development.[4] In the first half of the eighteenth century, these New Jersey mills were considered to be among the best in the country. From the advertisements of mills for sale published in the New York and Philadelphia newspapers we get a fairly good idea of their construction and equipment. They were usually found on a considerable plantation, very often in connection with other industries such as fulling mills, tanyards, etc.[5] The mill building was often built of stone, was three or four stories in height, and contained storage space for several thousand bushels of wheat.[1] The mills often had machinery for cleaning the wheat as well as bolting the meal. The bolting machinery was usually located in a separate building. It, as well as the hoisting apparatus by which the wheat was raised to the top story of the mill was operated by machinery.[2] The mills were usually operated by water-power and some advertised the fact that they used the overshot wheel — which would mean a more elaborate construction but would give more power.[3] Some of the mills specialized in 'country-work' (i.e., custom grinding), while others were merchant mills. In the latter class were a number of mills which advertised that they could ship with equal facility to the New York or Philadelphia markets.[4] Very often a bakery was operated in connection with the mill, so that with the plantation to grow the wheat, the mills to grind and bolt the flour, and the bakery to make it into bread, we have a fairly complete example of integration. It is on a small scale, of course, but carried farther than is done to-day.[1] And, finally, they usually emphasized the advantages of water transportation or location on good highways and nearness to market towns, and also location in regions producing an abundance of good wheat.

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[1] *Documentary History of New York*, I, 715–16.

[2] Kalm, *Travels into North America*, I, 230, 251. *New Jersey Archives*, X, 454.

[3] Johnson, *History of the Domestic and Foreign Commerce of the United States*, I, 78.

[4] Douglas, *British Settlements*, II, 293.

[5] New Jersey *Archives*, XII, 481–82. Advertisement in the *New York Gazette*, August 29, 1748, offering for sale two gristmills, a dwelling-house and thirty-five acres of land. 'The said mills are in very good Order, and built upon a large and convenient Stream that never wants for plenty of Water in all Seasons of the Year; also a large, strong, well-built Mill-House, three Stories and a Half high, being 33 Feet in Length and 28 in Breadth, with an Addition, also sundry large Rooms with good Conveniences for storing several thousand Bushels of Wheat, with sufficient room to store the Flour of two thousand Bushels when packt; also three very good Bolting Mills, whereof two goes by Water; with an advantage to hoise all the Flour by Water, which is a great ease, together with many other good Conveniences thereunto belonging.' The advertisement goes on to state that the mill is located in the county of Somerset, in East New Jersey, about ten miles from a landing on the Raritan River, in a well-settled neighborhood, and one that produces an abundance of wheat and other grain.

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[1] New Jersey, *Archives*, XII, 481–82.

[2] *Ibid.*, XII, 578–79. Advertisement in the *Pennsylvania Gazette*, October 5, 1749, offers for sale the mill-property of the late Nathan Allen of Allentown in Upper Freehold, Monmouth County, New Jersey. 'The two grist-mills are newly repaired in the best manner by skilfull workmen, and go with separate water wheels, independent of each other. The malt to bolt is drawn up by water, and the bolting mills go likewise by water. The mills are in a good place for custom.' They have been under lease for some time at £55 a year 'Proclamation Money.'

[3] *Ibid.*, XII, 256. Advertisement in the *Pennsylvania Gazette*, May 2, 1745. Andrew Hopman offers a plantation of one hundred acres, 'with a good orchard, Dwelling Houses, an Overshot Grist-Mill, and a very good Stream of Water, a Bolting House, and many other Good Conveniences, Within a Quarter of a Mile of Navigable Water.' This mill is in the county of Gloucester.

[4] *Ibid.*, XII, 210–11. Advertisement in the *New York Weekly Post-Boy*, March 19, 1745. To be sold by Samuel Rogers, of Crosswicks, Monmouth County, East Jersey, a plantation of 175 acres. 'Also two new well-built Grist-Mills with Two Pair of Stones and always fully employed, with two Bolting-Mills, both wrought by Water, one of which for the Country use, the other that makes Choice good Flour for either the New York or Philadelphia market, and can be transported with equally the same Charge; also a large new Storehouse for Wheat; a New Fulling-Mill, Press-House, and Dye-House, with good Conveniences for a Tan Yard and Shoemaker, and an undeniable Good Prospect for a Storekeeper.'

III. Pennsylvania and Delaware

In the New England flour trade, as we have seen, there was no unifying or centralizing influence until that region became definitely a food-importing district, with Boston as the chief distributing center. The Delaware River region, on the other hand, very early became a food-exporting region with Philadelphia as the center. Because of this export trade, there early developed a concentration of milling on the Brandywine and the Wissahickon, with large mills and specialized machinery, which distinguished this region from all others.

The first mill in the region seems to have been built before 1647. Governor John Printz reported to the Swedish West India Company in that year that he had built at a place called Mölndal (on Cobb's Creek near Philadelphia) 'a water-mill which runs the whole year, to the great advantage of the country, particularly as the windmill formerly here before I came, would never work, and was good for nothing.'[2] In 1658 some Dutch settlers petitioned for permission to erect a mill at the Turtle Falls on the Delaware River. This was granted on condition that they were not to charge a higher toll than was charged by the Company's mill at

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[1] New Jersey, *Archives*, XII, 257–58. Advertisement in the *New York Weekly Post-Boy*, May 20, 1745. Andrew Van Horne offers for sale his farm on the Raritan River two miles below New Brunswick. 'Convenient both for a foreign and inland Trade, and very commodious for the keeping of a Store. There is in it a good Dwelling-House, and Out-Houses, a Barn, a Grist-Mill, and Bolting House with two Bolting Mills, and things necessary for the carrying on grinding, bolting and baking. . . . There is also to be Sold or Let with the said Plantation, three Negro Men, one of them a good Miller and the other two understand Baking, Bolting and Country Work.'

[2] Myers, *Narratives of Early Pennsylvania*, 122.

Mölndal.[1] Some time before 1677 the first mill was built on the Christiana, as appears from a petition to Governor Andros in that year.[2]

The first mill built by the English settlers in Pennsylvania seems to have been that erected by Richard Townsend in 1683 at Germantown.[3] William Penn, with a number of partners erected one at Chester in 1695 [4] and one at Philadelphia — the 'Governor's Mill' — in 1700 or 1701.[5] Besides these water-power mills, we read of windmills, horse-mills and floating mills on the Delaware,[6] the last indicating a mill on a boat moored in the stream, power being provided by a large paddle wheel turned by the current.

Since wheat was the staple crop from the very first, the number of mills increased rapidly and they soon attained a reputation for technical excellence. Gabriel Thomas (1698) claimed that the water-mills of Pennsylvania 'far exceeded those in England, both for quickness and grinding of good Meal, there being great choice of good Timber, and earlier Corn than in the aforesaid place.' [7]

It is hard to say how early the export trade developed, but it must have been before 1700, for the first law to regulate the trade was passed that year. It provided that 'all biscuit and flour, made for transportation, shall be well made and honestly and truly packed, for the encouragement of our trade and credit, that those who purchase the same may not be cheated or defrauded.' The shippers of bread and flour were required to put their brand-marks on each cask and they were to be punished for 'false-packing' (presumably short weight or adulteration).[1]

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[1] New York, *Colonial Documents*, XII, 210. There is another grant for a mill at the same place in 1661. *Ibid.*, XII, 368–69.

[2] *Ibid.*, XII, 581.

[3] *Pennsylvania Magazine*, VIII, 279 ff., 'The Governor's Mill.' Bishop thinks the Chester mill was the older. See *History of American Manufactures*, I, 141.

[4] Watson, *Annals of Philadelphia*, III, 73.

[5] *Pennsylvania Magazine*, VIII, 279 ff., 'The Governor's Mill.'

[6] Watson, *Annals of Philadelphia*, I, 128.

[7] Myers, *Narratives of Early Pennsylvania*, 331.

As the trade increased in volume and importance, additional regulations were found to be necessary. Watson quotes a Jamaica newspaper complaining as early as 1722 of the deterioration of Pennsylvania flour.[2] Hence the law of 1724–25 provided for a system of inspectors to see that the purchaser was not defrauded in quality or quantity.[3] The law of 1781 fixed the dimensions and standard weights of the flour casks, and regulated the method of making them (the number of hoops, etc.). Each miller, bolter, or baker was to provide himself with suitable brand-marks and record them with the Clerk of Quarter Sessions. He was to brand each cask before it left his mill. Flour to be shipped out of the State must be of due fineness with no mixture of coarse or unmerchantable flour. The wagons transporting the flour to the landing-place must have a good and sufficient covering. Before flour could be carried out of the State, the cask must be bored into and sampled by the State inspector, who if satisfied was to brand the cask with the arms of the State.[4] The law of 1784 began a system of grading also. Heretofore the inspectors had passed only on the merchantability of the flour. Now they were authorized to brand the cask with the word 'superfine' if the flour was so deserving.[5]

By 1772 the Delaware River territory was exporting over 250,000 barrels of flour and over 38,000 casks of bread annually.[6] Something of the extent and direction of this traffic can be glimpsed from a study of the few stray Custom-House records of the Port of Philadelphia which are preserved in the library of the Historical Society in that city.[1] These records show (about 1760) occasional shipments of bread and flour to British ports, a very few to Quebec and Halifax, considerable shipments to Rhode Island and Boston, a few to the Carolinas. There is an interesting list of some twenty-five cargoes containing over 6000 barrels of flour shipped to Irish ports between November, 1765, and January, 1766.[2] The chief markets, however, are in the West Indies, particularly Antigua, St. Christopher's, Jamaica, Barbados, and New Providence. Sometimes the cargoes are quite small, at others fairly large, even judged by modern standards. Thus George Stewart, master of the brig *Charming Sally* ships to Antigua, May 27, 1757, among other things 140 barrels of flour, 42 kegs of middling bread, and 288 barrels of ship-bread. On September 29, 1759, Jonathan Lawrence, of Newcastle-on-Delaware, ships 917 barrels of flour and 24 kegs of bread on the sloop *Lark* to New Haven. On June 10, 1761, there is a certificate of John Ashmead, master of the ship *Live Oak*, who is carrying 45 barrels of flour and one hogshead, 220 barrels, and 222 kegs of bread to Jamaica.[3]

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[1] Dallas, *Laws of Pennsylvania*, I, 28.

[2] Watson, *Annals of Philadelphia*, II, 482.

[3] Dallas, *Laws of Pennsylvania*, I, 883. This list is not exhaustive. See Hanna, *Trade of the Delaware*, 250, for other examples of the regulations of this period.

[4] Dallas, *Laws of Pennsylvania*, I, 883–89.

[5] *Ibid.*, II, 226–28.

[6] Bishop, *History of American Manufactures*, I, 144.

The growth of this export trade seems to have caused a certain amount of concentration so that certain well-defined local centers or milling areas were created. We can refer to them only very briefly. Lancaster, as is well known, was the center of a considerable trade with the interior valleys of the Middle and Southern States and roundabout it was a fertile wheat-growing region. Tench Coxe says there were eighteen flour-mills within a radius of ten miles of Lancaster in 1786.[4] Farther west was Middletown on the Susquehanna. The navigation of the river was interrupted at this point and in consequence Middletown became a storage point and marketing center for the grain of the upper river. Grain dealers are said to have stored 160,000 to 180,000 bushels annually there, and this encouraged milling in the neighborhood. 'The millers of the surrounding country buy it here, grind it into flour and send it to Philadelphia.' [1] North of Philadelphia, at Easton, was another center. In 1795 there were eleven mills, which sent 35,000 barrels of flour annually to the Philadelphia market. Most important of all the Pennsylvania mills were those on the Wissahickon, a little stream flowing into the Schuylkill within the limits of Philadelphia. The Brandywine and the Wissahickon, Proud says, 'are noted for the best and most numerous grist-mills, either in this province, or any other part of British America, within the same extent of country, and which, perhaps, are not inferior in quality, to any in the world.' [2] La Rochefoucauld mentions a miller named Robertson who had three mills on the Wissahickon in which he ground 40,000 to 50,000 bushels of grain annually. He procured his wheat from Virginia, New York, New Jersey, and northern Pennsylvania — very little from the Schuylkill Valley, however, because there were so many other mills there. On the Wissahickon alone there were twenty-five mills above his.[3]

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[1] *Philadelphia, Custom-House Papers* (MS.), I, Historical Society of Pennsylvania Library.

[2] *Ibid.*, IV. [3] *Ibid.*

[4] Tench Coxe, *View of the United States*, 313.

In Delaware the chief mills were all situated in the neighborhood of Wilmington. That city is located between two streams, the Christiana and the Brandywine, which unite just below the city and flow into the Delaware. Within the city limits there was a considerable water-power on the Brandywine which was first developed in 1742 though there were mills on the Brandywine as early as 1729.[4] The stream ran through one of the best wheat-growing regions in America and in its rapid descent provided many mill-sites.

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[1] La Rochefoucauld, *Travels through the United States*, I, 90–91; IV, 157–58.

[2] Proud, *History of Pennsylvania*, II, 255.

[3] La Rochefoucauld, *Travels through the United States*, I, 13–15.

[4] Conrad, *History of Delaware*, 418; Ferris, *Settlements on the Delaware*, 302–03.

Winterbotham (1799) claimed there were one hundred and twenty mills of various kinds in its course.[1] While this was probably an exaggeration, the number of mills was undoubtedly large. In, or very near, Wilmington were twelve merchant mills which did no custom business at all, devoting themselves solely to the export business. In the season 1789–90 these mills produced 50,000 barrels of superfine flour besides other products.[2]

The interest which these mills excited in the European travelers who viewed them suggests that they had reached a high degree of mechanical excellence — higher perhaps than the mills in Europe. The twelve mills referred to had twenty-four sets of millstones and employed some two hundred people, including forty or fifty coopers and enough men to sail twelve thirty-ton sloops. These boats were used to bring wheat to the mills and carry flour to Philadelphia.[3] The navigation was so convenient that a sloop loaded with a thousand bushels of wheat could lie alongside any of the mills, the wheat being elevated mechanically to the top of the mill and the flour loaded directly into the vessel from the packing-floor.[4]

All of the operations about the mills were mechanically performed. 'Thus the sacks are hoisted into the granary, the flour is sifted, the grain is ground and bolted without the least manual labor.' [5] La Rochefoucauld's description of some of the mill mechanism is long, but worth quoting: 'At Brandywine the flour falls, as it is ground, upon a wooden roller armed with little detached wings, which are so arranged as to form a screw. This roller, fixed in a trough, is inclined towards a bin, in such a manner that it serves as a conductor to the flour. . . . A chain, of small troughs about three or four inches long, dips, into the bin which receives the flour. This chain is inclosed in long, perpendicular wooden cases. It turns upon two pivots, one of which is placed in the bin, where the little troughs fill themselves with the flour that is deposited there, and the other on the fourth floor where the same little troughs empty themselves, and thence descend, empty, to recommence their perpetual operations.'

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[1] Winterbotham, *View of the United States*, II, 416–17. La Rochefoucauld (*Travels through the United States*, III, 492–99) estimated sixty to eighty mills, not all flour-mills.

[2] Scott, *Gazetteer of the United States*, article, 'Wilmington'; Winterbotham, *View of the United States*, II, 466–67.

[3] Winterbotham, *View of the United States*, II, 466–67.

[4] Scott, *Gazetteer of the United States*, article, 'Wilmington.'

[5] La Rochefoucauld, *Travels through the United States*, III, 492–99.

The description refers, of course, to the conveyor and the elevator, American improvements in milling equipment which were unknown in Europe at that time. He continues: 'The flour conveyed by these troughs falls on an inclined circular floor, in the center of which are several holes, it is there spread by a rake as large as the floor, the teeth of which are so placed as to conduct the flour toward the holes through which it falls, cooled, into the bolters. These bolters are also different from those used in France and England, as the stuff which covers them, and through which the flour passes, is a fine silk, very closely woven. The millers assert, that, notwithstanding they pay six dollars an ell for this stuff, it is cheaper than the common bolting cloth, to which it is likewise to be preferred for giving a more beautiful color to the flour. These bolters will last five years in constant use without any repair; about twelve ells is sufficient to cover them. Hitherto the stuff has been brought from Holland, but a manufactory of it is about to be established at Wilmington.'[1]

The Brandywine mills ground large quantities of Indian corn for export to the West Indies, but their main product was wheat flour. Their wheat they purchased in Virginia, Maryland, and New York as well as in their own neighborhood. The wheat of eastern Maryland, they claimed, produced the best flour, 'on account of the goodness of the soil and the quickness of its growth,' but the wheat of several other States gave larger yields,[1] and the wheat from the rich clay soils of northern Delaware was considered almost as good.[1]

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[1] La Rochefoucauld, *Travels through the United States*, III, 492–99.

Other foreign observers concur in the view that the best mills in Pennsylvania and Delaware had reached a high degree of technical excellence as compared to those in Europe. Brissot de Warville (1794) describes one near Middletown. There were three sets of millstones destined to make flour of varying degrees of fineness. 'They employ only the stones of France for the first quality of flour.' These are imported from Bordeaux and Rouen. He is amazed at the automatic machinery. 'In these mills they have multiplied the machinery so as to spare hand labor in all the operations, such as hoisting the wheat, cleansing it, raising the flour to the place where it is spread to cool, collecting it again into the chamber where it is to be put in barrels.'[2]

So far as the millers catered only to a local trade they were likely to do only custom milling. The proprietors of the larger (merchant) mills were merchants as the name indicates, buying the wheat and selling the flour.[3] But the millers manufacturing for the export trade depended largely on merchant middlemen for the sale of their products. The usual custom was to consign the flour to them. But the merchants often speculated in flour, buying it outright and waiting for a rise in prices.[4] Such were men like Levi Hollingsworth who, in 1760 and the years following, sailed his shallop to the mills of the Christiana and brought back flour consigned to himself. Many of the men famous in political life, e.g., Joseph Wharton, Thomas Fitzsimons, George Clymer, were engaged in the business.

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[1] Scott, *Gazetteer of the United States*, article, 'Delaware.'

[2] Brissot de Warville, *New Travels in the United States*, 154–56.

[3] Incidentally they were apt to be many other things also. McAllister, a famous miller near Philadelphia, operated a big farm, a distillery and a sawmill as well as his flour-mill. La Rochefoucauld, *Travels through the United States*, I, 101–04.

[4] La Rochefoucauld, *Travels through the United States*, I, 101–04.

IV. Maryland and Virginia

On the whole, milling developed more slowly in the South than in the North. In Virginia and Maryland the profits of tobacco-growing were too great to allow a rival crop until the middle of the eighteenth century. After that there was a rapid growth of wheat cultivation and of flour-milling. With the Carolinas and Georgia we are not concerned because neither wheat-growing nor flour-milling ever developed any considerable importance there.[1] In Virginia and Maryland the growth of milling seems to have lagged somewhat behind the spread of wheat-growing. The explanation seems to be found in the nature of the labor supply. So long as wheat was grown only to supply local needs, with no effort to provide a surplus for export, there was no great need of mills. In the North the water-mill was developed even under those conditions, in the South there was no need of economizing labor and the hand-mill proved a satisfactory substitute, providing employment for the negroes on long winter days, saving tolls and keeping them out of mischief.[2]

In Maryland the first colonists 'set up a Water Mill for the grinding of Corne' at the edge of St. Mary's in 1634.[3] The third Maryland Assembly (1638–39) authorized the Governor and Council to contract for the building of another.[4] The number of mills increased so slowly that the Assembly of 1669 resolved to allow the expropriation of mill-sites whose owners refused to develop or sell them, 'Dayly Experience showing that the want of Watermills is the true Cause that husbandry in tilling the ground for, and sowing of Wheat and Barly is but coldly prosecuted. . . .'[1]

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[1] There were a number of mills of considerable importance at Camden, South Carolina, Charleston, South Carolina, and Fayetteville, North Carolina. See Bishop, *History of American Manufacture*, I, 148–49, and Ramsay, *History of South Carolina*, II, 121–23. Mills in Georgia were important enough to justify a law fixing mill tolls in 1786 (Commons, *Documentary History of American Industrial Society*, II, 346). There were even sporadic shipments of flour to the West Indies. But these Colonies never became self-sufficient as to food supplies.

[2] Tryon, *Household Manufactures*, 256 ff.

[3] Hall, *Narratives of Early Maryland*, 76, 'A Relation of Maryland.'

[4] Scharf, *History of Baltimore*, 373.

In spite of legislative encouragement, wheat-growing and flour-milling developed slowly in Maryland, and in fact did not become important until after 1700. Then development was dominated by geographic factors. The 'fall-line' running through Wilmington, Baltimore, and Washington divides Maryland into Piedmont and Tidewater sections. The Tidewater region is further divided by Chesapeake Bay into East Shore and West Shore.[2] The latter was settled first. It was and is mainly a tobacco-growing region. The East Shore also made tobacco a staple crop until about 1750, when the foreign markets became unfavorable. They then began to grow wheat and found they could do so profitably. By 1760 the northern counties were raising but little tobacco and their 'white wheat' had become famous. This they sent to the Brandywine mills, to Philadelphia and to Baltimore.[3] Meanwhile the Piedmont region was being settled and there, also, wheat became the staple product. Moreover, poor transportation and an abundance of water-power tended to develop milling in the Piedmont to a much greater extent than in the Tidewater region.

As the advantages of the Piedmont region came to be known, millers moved in from other colonies. In 1761 Joseph Ellicott and Hugh Burgess came from Pennsylvania to build a mill at Baltimore. In 1762 William Moore came from the Brandywine to take over the old Hansen mill, the first mill built at Baltimore. In 1762 Ellicott's brothers bought a tract containing several mill-seats on the Patapsco River ten miles west of Baltimore.[4] The mills they built there (they called the place Ellicott City) have had a continuous history to this day and deserve special mention.

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[1] *Archives of Maryland*, II, 211–14. Proceedings and Acts of the General Assembly.

[2] Lefferts, *Tidewater Maryland*, 5.

[3] La Rochefoucauld, *Travels through the United States*, III, 492–99.

[4] Hall, *Baltimore*, I, 70.

The Ellicotts were Quakers. They seem to have been quite wealthy, for they bought a large tract of land and brought with them a considerable household. The picturesque and rocky glen in which they located their mill was at first quite isolated, so that they had to grow all their own wheat. After 1783, however, they began to get supplies both from the Eastern Shore and the Piedmont. Roads were opened eastward to Baltimore and westward into Frederick County.[1] A wharf was secured at Baltimore and they began to export their flour. They encouraged stock-raising and the use of fertilizers among their neighbors and brought in new settlers. Above all they seemed to have turned many planters from tobacco to wheat-growing, by supplying a market for the cereal.[2]

It is not correct, however, to say, as has been said,[3] that the Ellicotts were responsible for the rise of wheat-growing in Maryland. The *Annapolis Port Records* show for the years from 1756 to 1766 an average annual export of nearly ten thousand barrels of flour, besides shipbread and unground wheat.[4] This was mainly before the Ellicotts came to Maryland. Moreover, the trade was probably well established even before this. The *Gibbons Account Books* in the Library of Congress show one merchant exporting flour from Georgetown and Alexandria to the West Indies as early as 1720.[5]

The general nature of this trade, as shown by the *Annapolis Port Records*, is quite similar to that of Philadelphia. In this case we have more data so that the relative importance of the different markets is clearer. The West Indies took about seventy per cent of the shipments. Barbados was the chief market. Only occasional shipments to non-English islands are shown, but doubtless much of the exports to

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[1] Tyson, *Settlement of Ellicotts Mills*, 19–22.

[2] *Ibid.*, 8–14.

[3] *Ibid.*, 3.

[4] *Annapolis Port Records* (MS.), Maryland Historical Society.

[5] *Gibbons Account Books* (MS.), Library of Congress.

Barbados and Jamaica were carried to French and Spanish colonies through inter-insular trade.[1] Next to the West Indies, the best markets were in continental British America, particularly New England and the Carolinas. Some shipments to New York are listed, probably destined to be re-exported. Brissot de Warville says that New York was the favorite port of the English so that the colonials found it profitable to bring Virginia and Maryland products to that city and re-export them as New York flour.[2] Next in importance were the ports of southern Europe, particularly Lisbon, Cadiz, and the Madeiras. And, finally, there were some shipments to the British Isles, but so widely scattered that no one port stood out particularly, though here, as at Philadelphia, there was a noticeably large proportion going to Irish ports.

The greatest milling growth in Maryland was concentrated almost from the first in Baltimore and its environs. The study of the growth of that city as a milling center will be left for the next chapter, however. We turn instead to take up milling in Virginia.

In that colony, the records of the Virginia Company show a windmill completed and a water-mill in the course of erection in 1621.[3] These early mills seem to have been used only for grinding Indian corn, the first wheat mills not appearing until about 1670.[4] In 1649 a contemporary report says 'They have 4 Windmills and 5 Water-Mills to grind their Corne, besides many Horse-Mills of several kinds, and Hand-Mills for several uses.'[5] Here, as in Maryland, the number of mills grew slowly so that the Legislature found it desirable (1667) to offer, as an inducement to mill-building, the right of expropriation where owners of mill-sites refused to sell or improve them.[6] After 1700 the number of mills increased more rapidly,[1] but as late as 1795 La Rochefoucauld found good mills not very common in Virginia.[2] The reasons suggested are, first, a lack of capital for mill-building and, second, the poorly developed mercantile organization which still depended on outside merchants and left the native traders scattered and ill-organized.

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[1] Hanna, *Trade of the Delaware*, 262.

[2] Brissot de Warville, *New Travels in the United States*, 127.

[3] Neill, *Virginia Company*, 283.

[4] Bruce, *Economic History of Virginia*, II, 487.

[5] Force Tracts, II, 'A Perfect Description of Virginia.'

[6] Hening, *Statutes of Virginia*, II, 260.

In Virginia, as in Maryland, there was a shift to wheat-growing in the Tidewater region about 1750. 'Sir,' writes Roger Atkinson, merchant, to a European correspondent in 1770, 'it is with great Pleasure I acquaint you that we have now got another staple of late years, as it were created, viz., wheat, which will, I believe, in a little time be equal, if not superior to Tobacco — is more certain and which we shall, in a few years, make more in Virginia than all the Province of Pennsylvania put together altho' it is their staple commodity.' [3] Here, as elsewhere, the extension of wheat-growing caused the building of new mills. Many of the planters followed the examples of Washington [4] and Jefferson [5] in building mills on their own plantations. As a result the industry was more widely scattered than in the colonies to the North.

In Virginia, as in Pennsylvania, some light is thrown on the growth and distribution of milling by a study of governmental regulations. The policy begins as early as 1645 with a law regulating the amount of toll,[6] but does not acquire much importance until 1765. In that year a new law provided that the exporter of flour must take oath that his flour was not adulterated and that his casks were justly tared.

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[1] Bruce, *Economic History of Virginia*, II, 487–90.

[2] La Rochefoucauld, *Travels through the United States*, III, 18.

[3] *Virginia Magazine*, XV, 350, 'Roger Atkinson Letters.'

[4] For Washington's mills, see Commons, *Documentary History of American Industrial Society*, I, 190–91, for two letters dealing with Washington's milling business. Also *Northwestern Miller*, February 18, 1925, p. 571 ff., 'George Washington as a Miller.'

[5] Jefferson (*Writings*, XIII, 326 ff., letter to Isaac McPherson, August 13, 1813) refers to his own mill built between 1782 and 1790.

[6] Hening, *Statutes of Virginia*, I, 347.

The inspector was to sample each cask to see if the flour was merchantable. If it was, he was to brand it with a 'V,' his name, and the gross and net weight.[1]

In 1772 it was provided that the inspectors, who were to be appointed by the judges of the County Court, were to determine not only the merchantability of the flour but also its grade, branding the barrels with the letters 'SF' for 'Superfine' and 'F' for 'Fine.' Flour for export must be branded with the owner's name, or the name of the mill, and brands must be recorded in the County Court. The weights and measures of the mills were to be inspected also. Flour in transport must be protected in bad weather by the carriers.[2]

An act of 1782 provided for the inspection of export flour at Alexandria, Richmond, Fredericksburg, Petersburg, and West Point, evidently the chief centers of the trade at that time. Any merchant mill on navigable water below the fall line might have its flour inspected at the mill, while flour brought in by river or canal might be inspected at the landing.[3] It was further provided in 1782 that only standard-sized barrels (196 pounds) could be used in the export trade.[4] An act of 1785 provided for the inspection of bread as well as flour.[5] In 1792 there was a prohibition against packing flour in used barrels, 'for evil-disposed persons have packed flour and meal in old casks, which have been branded agreeable to this act, by which means the valuable staple is often injured in foreign markets.'[6]

By the end of the colonial period, Richmond had become the chief milling center in Virginia. But here, as in the case of Baltimore, detailed study will be deferred to the following chapter.

V. Summary: General Conditions

The general conditions of the industry at the end of the colonial period may now be summarized briefly from the

[1] Hening, *Statutes of Virginia*, VIII, 143.

[2] *Ibid.*, IX, 250.

[3] *Ibid.*, X, 496–98.

[4] *Ibid.*, XI, 98–99.

[5] *Ibid.*, XII, 515–20.

[6] *Ibid.*, XIII, 517–24.

facts previously brought out. We note first, that the industry was exceedingly scattered, being widespread throughout the colonies. Said Jefferson in 1786: 'There is no neighborhood in any part of the United States without a water gristmill for grinding the corn of the neighborhood.'[1] Poor facilities and the high cost of transportation tended to make each locality self-sufficient, and therefore most of the mills were small custom mills catering only to a local trade. Except when located on the seacoast, the miller could not sell a large output; unless located on a navigable river flowing through a fertile valley, it was difficult to secure an adequate wheat supply. The ideal location for a mill in those days was one at the head of navigation on a moderately large stream running through a good wheat-raising area. There, the wheat coming downstream from the farms along the banks, would have to be transferred to wagons or boats, making the place a desirable one for wheat buyers to assemble. The falls of the stream would furnish a desirable water-power and the ships which carried the flour to market could load directly from the packing-floor of the mill.

The scattering of the mills reflects the fact that wheat-growing was also widespread throughout the colonial period. In the pioneer stage, almost every one grew some wheat in order to attain self-sufficiency. After this stage was passed and farming for the market attained, wheat became the staple crop in those regions best adapted to wheat-growing. This first wheat belt, developed at the end of the colonial period, may be roughly defined as including, at the north, the Hudson Valley and the eastern end of the Mohawk, with an extension into eastern Vermont and western Connecticut; in New Jersey a belt of land extending from New York City to Philadelphia; in Pennsylvania the southeastern quarter of the State; the northern part of Delaware; and the Piedmont region of Maryland, Virginia, and northern North Carolina. In Virginia and Maryland it included also a part of the Tidewater region. In general this was a region which compared favorably in soil and climate with the best wheat-growing areas in other parts of the world. It was peculiarly favored with natural facilities of transportation. At its southern end, the wheat belt was hindered in its development by the presence of a competing staple, tobacco. But the decline in prices and profits of tobacco-growing after 1750 caused a shift to wheat-growing. The rise in wheat and flour prices at about the same time intensified this tendency.

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[1] Jefferson, *Writings*, v, 403. Letter to M. de Warville, August 15, 1786.

The mills were therefore most numerous in this wheat belt. There the merchant mill was developed, though custom mills continued to be important. In those localities where there was a conjunction of wheat supplies, water-power, and facilities of transportation to foreign markets, there was a considerable concentration of milling — especially on the streams near the chief colonial market of Philadelphia.

The merchant mills, which bought the wheat from the farmers and sold the finished product, seem to have been mainly interested in the export trade, although in every considerable town they must have sold at retail to consumers. Large quantities of flour were also shipped to the colonies outside of the wheat belt: to New England, the Carolinas, and Georgia. The export trade was largely in the hands of merchant middlemen who received the flour on consignment and sold it on a commission basis. Since marketing organization was but slightly developed, prices often varied widely from one town to another. Prices were supposed to be based on those of the European markets, but responded only slowly to European price-changes owing to the distance and the slowness of communication. Locally, the price of flour was supposed to line up fairly closely with the price of wheat. In Pennsylvania, for example, the Assize of Bread regulated the price of bread by that of wheat. In 1775, however, the Legislature found it necessary to make a change, for, they said, 'the price of wheat by no means determines with certainty the price of flour.'[1] Over long periods, for any given market, the price of flour seems to have been fairly stable, however, the chief exception to this being the considerable rise in flour prices beginning about 1750, due to increased foreign demand, and causing a very considerable expansion of the milling industry.[2]

Most characteristic of the colonial period was the extent to which the industry was controlled by the government. As we have shown, the colonial governments encouraged mill-building. In some colonies a monopoly of grinding was offered for a term of years; in others the mill-builder was given the right to cut timber on all unfenced lands, or to expropriate the owner of a mill-seat who refused to sell or develop it. The export of wheat was prohibited at times so as to conserve the millers' supply and in some colonies bounties were offered for both wheat-growing and flour manufacture.

But the miller was also regulated in other ways. The government fixed the toll which he might charge for custom milling. In regions where merchant milling was highly developed, it compelled the miller to set aside certain millstones — or certain days — for custom work. Most important were the inspection laws which were gradually developed in the exporting colonies. At first these attempted only to prevent short weight and adulteration, to insure that the flour was 'merchantable.' Gradually it was extended to the inspection of the milling machinery and the weights and measures used. The transportation of the flour as well as its milling was regulated. Provision was made for standard containers. The State's approval on the product was indicated by putting on a State brand. And finally the inspectors graded the flour (fine, superfine), thus assuring the buyer not only that it was merchantable but that it was of a given standard of quality.

It is remarkable that the industry should have, even in this early period, depended so largely on foreign markets. The export trade, as we have shown, was primarily with the West Indies: with the British islands, with the neutral Dutch and Danish possessions, and, irregularly and sometimes indirectly, with the French and Spanish colonies. In exchange, the continental colonies received sugar, molasses, dyes and dyewoods, and cacao, much of which was then re-exported to England to bring in the needed manufactured goods.[1] From the non-British colonies money rather than goods was received,[2] especially the Spanish pieces-of-eight which formed the principal money of the colonies before the Revolution. In addition to the West Indian trade there were exports to southern Europe as early as 1700, but these were irregular and fluctuating.[3] Distance from market made it difficult to gauge supply and demand correctly, freight rates were high and the product frequently deteriorated greatly on the long sea voyage. In any case, the European countries (except, perhaps, Spain and Portugal) were normally able to provide their own flour supplies and demanded American shipments only in years of crop failures.[4] Even then they preferred the unground grain rather than flour, though, as Jefferson argued, we could 'sell them the flour ready manufactured for much less than the wheat of which it is made. In carrying to them wheat, we carry also the bran, which does not pay its own freight. In attempting to save and transport wheat to them, much is lost by the weevil, and much spoiled by heat in the hold of the vessel. This loss must be laid on the wheat which gets safe to market where it is paid for by the consumers. Now, this is much more than the cost of manufacturing it with us, which would prevent that loss.'[5] There were other factors which prevented a further extension of American markets in Europe, for example, commercial restrictions and the activities of the Algerian pirates in the Mediterranean,[1] but this was perhaps the main factor. Quoting Jefferson again: 'Observe that we have regular and constant markets for our corn and flour in Spain, Portugal, and all the West India islands except the French. These take nearly our whole quantity. This year [1789] France, the French West Indies, and Canada were added. But a regular course of trade is not quitted in an instant, nor constant customers deserted for accidental ones.' This, he explained, was the reason for the small shipments to France.[2]

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[1] Dallas, *Laws of Pennsylvania*, I, 707–10, ch. 718, 1775. Act to Regulate the Assize of Bread.

[2] Clark, *History of Manufactures*, 139.

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[1] New York, *Colonial Documents*, v, 55 ff.

[2] *Ibid.*

[3] *Documentary History of New York*, I, 714 ff.

[4] Jefferson, *Writings*, VII, 403. Letter to La Fayette, July 9, 1789.

[5] *Ibid.*, v, 222. Letter to John Adams, November 27, 1785.

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[1] Jefferson, *Writings*, VIII, 434–35. Letter to David Humphreys, November 6, 1792.

[2] *Ibid.*, VII, 403. Letter to La Fayette, July 9, 1789.

Exports of foodstuffs in 1770:[x]

	To Great Britain and Ireland	To South of Europe	To West Indies	Total
Wheat, bushels........	161,724	588,561	955	851,240
Bread and flour, tons...	3,846	18,501	23,449	45,868
Indian corn, bushels...	150	175,221	402,958	578,349
Meal, bushels..........	......	......	4,430	4,430
Shipstuff, barrels......	......	7327	640	7,964

[x] Minor shipments to Africa omitted so totals do not check.

(Pitkin, *Commerce of the United States*, 21–23.)

Exports of foodstuffs in 1792:

	From New England	From Middle States	From Southern States	Total United States
Wheat, bushels.....	599	316,492	536,699	853,790
Flour, barrels.......	37,778	453,165	333,521	824,464
Bread, barrels......	8,283	47,407	25,296	80,986
Indian corn, bushels	119,985	654,305	1,190,683	1,964,973
Indian meal, barrels	3,590	42,043	7,048	52,681
Crackers, kegs	3,477	24,683	9,485	37,645
Rye meal, barrels...	827	12,970	321	14,126[y]
Shipstuffs, barrels...	......	4,265	1915	6,180

[y] Totals incorrect in the original.

(Coxe, *View of the United States*, 413–17.)

CHAPTER II

THE EASTERN FLOUR-MILLING AND MARKETING CENTERS, 1790–1860

THE revolution in methods of transportation, together with the growth and westward extension of population during the period 1790–1860 brought great changes in the milling industry. Larger markets brought about a concentration of milling in certain favored sections and cities: Baltimore and Richmond at the 'fall line,' Rochester and Oswego in western New York, and St. Louis in the Middle West. In this, as in the preceding period, the nearness to wheat supplies was still the dominant factor in the growth of the industry. Hence each step in the westward movement of the wheat belt marked the rise of a new milling center. Concentration of milling brought with it, also, an increase of intersectional trade in flour, which in turn caused certain flour-marketing cities to rise to importance either as centers of supply or of distribution. Philadelphia gave place to New York as the chief market, but Boston, Baltimore, and New Orleans came to the front to threaten that city's leadership. And, finally, the concentration of milling was encouraged by a series of improvements in the technique of milling, which tended to give the large merchant mills great advantages over the smaller custom mills. These are the developments which are to be considered in this and the following chapters.

I. BALTIMORE AS A MILLING CENTER — DOMESTIC AND FOREIGN TRADE

The first mill erected in or near Baltimore seems to have been built by Jonathan Hansen in 1711. A little stream called Jones' Falls provided the power, and the structure, solidly built of stone, remained standing for more than a century.[1] Various other mills were built near it in the following decades, some by planters to supply their own needs, while others, catering to the export trade, were provided with bakeries to bake bread and ship-biscuit.[1] The extension of staple wheat growing to the Piedmont region and the change of the Eastern Shore from tobacco to wheat described above,[2] helped to build up Baltimore both as a milling and a marketing center. Schoepf (1789) pointed out the rapidity of the city's growth, emphasizing its advantages of location. It was near the geographical center of Maryland, easy of access from the interior of Pennsylvania and Virginia and close to the transmontane regions of Ohio and Kentucky. By his day, Baltimore had drawn to itself the trade of western Pennsylvania, of the interior valleys of Virginia and most of Maryland. Baltimore was considered a good market, 'for, Philadelphia excepted, there are nowhere in that country so many merchants gathered together, and ready to take up what is offered.' [3] The city had grown most rapidly of all the Atlantic ports during the Revolutionary War. It had been most protected from sea raids and had become the chief port for the West Indian trade.[4]

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[1] Hall, *Baltimore*, I, 64–65.

The trade in flour to the Spanish West Indies seems to have been especially profitable to the Baltimore merchants during the War of Independence. A barrel of flour costing four Spanish dollars at Baltimore sold for thirty-six dollars at Havana. Though the hazards of the trade were great, the Baltimore merchants combined to distribute the risk and their wealth grew rapidly.[5] Other merchants moved to Baltimore from the smaller towns in Maryland. At first most of them were merely factors using the funds of Philadelphia merchants, but after the Revolution large supplies of local capital and the development of banking made the Baltimore merchants independent of the older center.[6]

The growth of Baltimore's export trade in flour was hampered for a time, after 1783, by the restrictions which

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[1] Hall, *Baltimore*, I, 502.

[2] See above, p. 28.

[3] Schoepf, *Travels in the Confederation*, I, 326–27.

[4] *Ibid.*

[5] *Ibid.*, I, 329.

[6] La Rochefoucauld, *Travels through the United States*, II, 672–75.

Great Britain placed on trade with her West Indian colonies. In part this was compensated for by a growth of trade with Haiti and San Domingo,[1] and with the French and Spanish islands during the Napoleonic wars in Europe. Baltimore ships carried foodstuffs to the French and Spanish colonies and the trade flourished in spite of the English efforts to suppress it.

Meantime, trade had begun also with the north coast of South America.[2] Brazil was thrown open to American trade after the removal of the Portuguese royal family to Rio de Janeiro in 1810. By 1825 the South American trade extended to the west coast also, and Baltimore's ships were carrying flour to Peru and Chile. The sugar of the West Indies, coffee from Brazil, hides from Argentina and Uruguay, cocoa and indigo from Venezuela, silver and copper from Chile and Peru, and (after 1824 [3]), the Peruvian guano, which was to play such a large part in the agricultural development of our Southern States, came to Baltimore. In return there was exported a variety of products, among which flour was the most important. At the height of the trade (1825–60) flour constituted seventy per cent of the exports to Brazil and over half of the shipments to other South American countries.[4]

The relative importance of the various South American markets is indicated in the table given below.[5] The West

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[1] Sparks, Baltimore, *North American Review*, xx, 104–09.

[2] Rutter, *South American Trade of Baltimore*, 11–13.

[3] *Plough, Loom and Anvil*, II, 787–89.

[4] Rutter, *South American Trade of Baltimore*, 16–17.

[5] Exports of flour from Baltimore (annual average in barrels):

	1840–44 *	1846–50 *	1851–55	1856–60	1861–65
To Brazil.............	107,438	108,021	122,725	128,087	154,085
Argentina and Uruguay	7,134	12,483	17,808	25,977	10,881
Venezuela.............	12,737	10,189	8,650	3,988	726
Great Britain..........	25,530	112,320	175,841	67,055	38,476
West Indies...........	99,121	110,329	139,918	150,586	85,561
Other countries........	32,321	83,221	72,863	87,304	32,451
	284,281	436,563	537,805	462,997	322,180

* Statistics for 1845 and exports to Uruguay, Venezuela and the West Indies for 1846 missing.

(Rutter, *South American Trade of Baltimore*, 18.)

Coast market was never very important and did not last. By 1860 Chile was producing enough flour to supply herself and her neighbors as well. On the East Coast, the export to Argentina and Uruguay lasted somewhat longer, but there also the growth of the Argentine mills cut off the demand for Baltimore flour. The Brazilian market, however, came to be the chief reliance of the Baltimore merchants and proved to be more permanent. The Brazilians wanted a high-grade flour made from the very best wheat with a relatively low moisture and high gluten content, such as would stand the passage by sea through the tropics.[1] Only the Baltimore and Richmond mills seemed to be able to meet these demands, hence they monopolized the trade. Since the flour was used only by the wealthier classes, the demand fluctuated but slightly and the market was a stable one.

As between Baltimore and Richmond, the former city had the advantage in being a better market for Brazilian coffee. Baltimore also had more ships of its own (i.e., depended less on vessels whose home ports were rival cities). The supplanting of the sailing vessel by the steamship, and the growth in size of ocean-going vessels favored Baltimore with its better harbor. For these reasons Baltimore gradually drew ahead of Richmond in the Brazilian trade, and, after the Richmond supply was cut off by the Civil War, controlled it alone.[2]

For a time after 1815 shipments to European countries languished. But after the repeal of the Corn Laws, flour exports to England and Scotland rose rapidly and after 1860 Great Britain was the most important market for Baltimore flour. There were also considerable shipments to France, to Holland, and to the Hansa Towns in certain years, though that trade was on the whole a more fluctuating one.[3]

Along with this export trade Baltimore flour had also developed a considerable domestic market, the boundaries of which we have not the data to define clearly. From 1840 to 1855 the number of barrels of flour inspected averaged about double the number exported. The chief domestic market seems to have been in the South Atlantic and Gulf States, part of the flour being shipped coastwise to the Carolinas and Georgia, part westward by rail. The trade with the Gulf States seems to have been at its height about 1880, declining after that date because of the building of railroads tributary to Cincinnati, Louisville, and St. Louis.[1]

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[1] Beck, Second Report on the Breadstuffs of the United States, *Patent Office Reports, Agriculture*, 1850, 81–82.

[2] Rutter, *South American Trade of Baltimore*, 20–21, 30–31.

[3] *Hunt's Merchants' Magazine* (1858), XXXVIII, 423.

The growth of export and domestic shipments naturally caused a growth in flour receipts, and of the area from which they were drawn. Before 1800 there were two kinds of flour sold by the Baltimore merchant: 'wharf flour' produced by country mills in the Tidewater region and brought by boat to the Baltimore market, and that of the city mills. By 1830 there were other sources of supply;[2] flour began to flow in from the Piedmont region of Virginia and Maryland — the 'Howard Street' flour, so called from the place of its inspection.[3] With the building of the Baltimore and Ohio Railroad this became the chief source of supply. From Virginia came also the flour of such minor milling centers as Fredericksburg and Falmouth, though for this trade Baltimore had to fight not only Norfolk and Richmond, but Alexandria and Georgetown as well. Down the Susquehanna River came the

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[1] Bland, *Review of the Commerce of Baltimore*, 126.

[2] Flour inspections at Baltimore (in barrels, 1838, 1853):

	1838	1853
Howard Street	192,014	593,807
City Mills	208,194	439,590
Susquehannah	15,016	65,587
Fredericksburg	2,666	
Richmond	2,311	
Pittsburgh via Penna. Canal	438	
Ohio		56,210
'Family'		26,409

(Hazard, *United States Register*, I, 28; *Hunt's Merchants' Magazine* XXXVIII, 421.)

[3] *Hunt's Merchants' Magazine*, XXIII, 50–51 (1850).

'Susquehanna flour,' from a large area of Pennsylvania and even from New York State. In the early days it was floated down in 'arks,' but as late as 1850 much of it came to the Baltimore market in great wagons. The growth of the railroads centering in Philadelphia tended to cut off this supply after 1860. Finally, there was the 'Ohio flour,' which did not show up in the inspections before 1850, but gradually grew in importance after that date, and by 1880 had become the most important source of supply.

So far we have been dealing with the growth of the city as a marketing center. Turning now to the growth of the Baltimore mills, we recall Baltimore's advantages of location on the fall line where a number of streams provided suitable water-power.[1] It was fortunate also in having in the early days a number of pioneer millers of unusual enterprise and skill, such as the Ellicotts.[2] When Oliver Evans brought in his new milling methods,[3] the Baltimore millers seem to have been quicker than any others to utilize them and the resulting advantage in costs of production doubtless helped to build up the Baltimore mills faster than those of their competitors in the outlying area. The growth of Baltimore as a flour market operated to the same effect. As a result there were, in 1805 within eighteen miles of the city, 'fifty capital merchant mills' . . . of which sixteen were within four miles of the city.[4] Some of these were famous in their day (e.g., the Patapsco mills at Ellicott City), though none were as large as the two great mills at Richmond.[5]

By 1825 the number of mills in or near the city had increased to sixty with an invested capital of $1,200,000. The historian Sparks classified them as follows: four first-class merchant mills of 200 barrels capacity each, seven of 120 barrels capacity, fourteen of about 100 barrels, and four of 50 barrels.[1] This would account for about half the mills, the other half being presumably smaller and less regular in their production and perhaps devoting much time to custom grinding.

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[1] Sparks, Baltimore (*North American Review*, xx, 125–26), lists eight streams with a total of 2360 h.p.

[2] See above, p. 29.

[3] See below, p. 96 ff.

[4] Scott, *Geographical Dictionary*, article 'Baltimore.'

[5] See below, p. 49.

The census figures [2] for this period are of doubtful value, but they do show the rapid growth of the Baltimore mills and the decline of the country mills in the Tidewater region. By 1840 Baltimore had taken the leadership away from the Piedmont mills and by 1860 far outdistanced them. The increase in output was accompanied by an increase in scale of production. The number of mills decreased, but capitalization grew larger, machinery more specialized, technique more skillful.

The census figures also show a considerable concentration

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[1] Sparks, Baltimore, *North American Review*, xx, 123.

[2] Distribution and output of flour-mills in Maryland by counties:

County	1810		1840		1860	
	No. of Mills	Bbls. of Flour	No. of Mills	Bbls. of Flour	No. of Mills	Value of Product
Allegheny......	10	7,550	11	2,990	17	288,788
Anne Arundel...	7	19,900	5	27,260	16	66,135
Baltimore......	65	39,000	23	150,596	41	3,046,579
Calvert........	..	.....	..	.....	2	3,460
Caroline........	..	.....	..	.....	14	123,652
Carroll.........	..	.....	31	23,300	49	441,219
Cecil...........	36	17,100	1	500	36	620,289
Charles.........	..	.....	..	.....	4	18,600
Dorchester......	..	.....	..	290	..	.....
Frederick.......	101	84,080	46	118,598	79	1,286,171
Harford........	58	5,930	7	11,900	40	385,939
Howard........	..	.....	..	.....	7	644,194
Kent...........	16	.....	7	1,250	8	84,000
Montgomery....	42	10,200	1	3,000	34	318,657
Prince George...	12	5,100	1	5,100	8	146,700
Queen Anne....	..	.....	..	.....	3	38,000
St. Mary's......	..	.....	4	100	22	71,460
Somerset.......	..	.....	..	.....	9	24,133
Talbot.........	..	.....	..	.....	14	125,035
Washington.....	52	86,250	52	121,824	21	498,200
Totals........	399	275,110	189	466,708	424	$8,231,271

(*American State Papers, Finance*, II, 715; *Compendium of the Census of 1840; Census of 1860, Manufactures.*)

of milling in Frederick and Washington Counties in western Maryland. For a time there was a good deal of rivalry between the city millers and these 'up-country' ones. This showed itself especially in the controversy over the question of State flour inspection during the years 1821–25. An inspection system had been established in Baltimore by the City Council in 1797.[1] About 1821 the millers from the western part of the State petitioned the Legislature for a change in the system which, they claimed, favored the Baltimore millers unduly. They asked that the appointment of the inspectors be vested in the Governor and that the inspectors use separate and distinct brand-marks for the flour of the two regions. The minority report of the legislative committee appointed to consider this petition throws much light on the milling situation in Maryland at that time.[2]

The main contention seems to have been over this matter of separate brands for the flour of the two regions. Apparently the wheat supplies of the Baltimore mills were inferior, being mixed with wild garlic. Moreover, their wheat was very hard so that the Baltimore millers had to grind closely and with great pressure. As a consequence the bran was pulverized, and could not be sifted out of the flour, which was accordingly somewhat discolored. But the up-country millers felt that they were not getting the advance in price which the superiority of their flour entitled them to, because the inspector's brand did not distinguish the two classes of flour.

There seem to have been several other causes of disagreement. The up-country millers claimed that the Baltimore inspectors had suddenly raised their standards the summer of 1824 and thereby caused much unnecessary hardship and loss. The inspectors defended this as made necessary by New York competition. With the (partial) opening of the Erie Canal much flour of very high quality was coming to New York City to compete with the Baltimore product. Again the country millers felt that the inspectors were favoring the Baltimore millers unduly in the grades, hence their desire to have the inspectors appointed by the Governor. Finally the country millers claimed that the Baltimore millers were turning out a much larger quantity of flour, per set of millstones, than their country competitors, the inference being that this flour could not be of the highest quality. To which the Baltimore millers replied that they used overshot wheels by which they got more power and could utilize their water-supply to the best advantage in dry seasons.

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[1] City of Baltimore, *City Council Ordinance* No. 13, February, 1797.

[2] Maryland House of Delegates, *Journal* (1825), 229–33.

It is easy to see how the Baltimore millers, using a system of hard, close grinding and driving their millstones at high speed, could turn out more flour than the country millers. In addition, they seem to have had a number of other advantages. Thus they found it easier to make repairs, and lost less time over it, because there were skilled repair men in their town. They had the capital to put in the most modern and specialized machinery. They operated on a larger scale. Hence they could produce more flour per unit of labor and capital.

The minority report was turned down by the Legislature and the State inspection system was established.[1] After that we hear no more of any rivalry between the Baltimore and the country millers. The former were expanding their production so rapidly that by 1860 they had completely outdistanced the country millers. The system of inspection remained unchanged, however, until 1872. Then the compulsory feature of the law was dropped. The country mills continued to have their flour inspected for some time thereafter, but the city mills evidently felt that the reputation of their brands was so well established as to make the system unnecessary. Hence they ceased to use it.

Baltimore was therefore both a great milling center and a great flour market at the end of the period under consideration. Roughly a million barrels of flour were marketed annually, of which about half were manufactured in the city and the rest brought in from tributary territory. About half a million barrels were exported annually and the remainder sold to the Southern States. In 1825 it was claimed that Baltimore was the largest flour market in the world.[1] In 1860 it was second only to New York.[2]

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[1] Howard, *The Monumental City*, 134.

As a manufacturing center, Baltimore held its own, absolutely, if not relatively, until about 1880.[3] When the 'New Process' was developed by the Western millers, those of Baltimore adopted it rather slowly and unwillingly. But 'the greater favor obtained by the so-called "New Process," first applied extensively by the Western millers, has compelled our millers to adopt the same mode of manufacture,' said a local writer of the period.[4] While they had lost ground in the European market they had continued to hold the Brazilian. But now they began to lose this also. For 'with this innovation has been dispelled the delusion that none but our local brands were suited to tropical countries, which, once true, gained for them a reputation now justly claimed for the products of the recent method.'[5] Thus the Baltimore mills slowly declined to a minor place in the industry. As the hard wheats established their superiority for bread-making, the product of Baltimore was restricted to the making of cakes and pastry. In this field the mills of Baltimore and of the Baltimore area still have a profitable, and so far as one can now see, a permanent, though limited, market.

II. The Beginnings of Large-Scale Milling in Richmond

At the end of the colonial period wheat-growing and flour-milling were widespread throughout Virginia, in the Tidewater counties as well as the interior valleys. In part this indicated a tendency to local self-sufficiency, but a number of towns were rising to importance through a concentration of milling and an export of flour. Of these Richmond was most important. A mill is said to have been erected there as early as 1732,[1] but it was not until after the power canal was constructed around the falls of the James River (1794) that milling became important. The advantages of the city for milling were obvious enough: the water-power made available by the canal, the large wheat area along the upper James River which was tributary to the city, and the facilities for export. For in those days the lower James was navigable for fifteen-foot vessels to within three miles of the center of the city.[2] When La Rochefoucauld visited Richmond in 1795 there were two mills there. He inspected one of them. It was a large mill but badly constructed and the product far from the standard of the Brandywine mills, so that its flour sold at a lower price in the Philadelphia market.[3] This particular mill was operated by a Frenchman named Chevallier. It did a little custom work, but mainly a merchant milling business. Large profits had been made in shipments to Europe in the years before 1795, but the sudden fall in prices in that year had caused considerable losses.[4]

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[1] Sparks, Baltimore, *North American Review*, XX, 123. The same claim is made in 1840. Haskel and Smith, *Gazetteer*, 48, article 'Baltimore.'

[2] *Hunt's Merchants' Magazine*, XXXVIII, 421, 'Baltimore Flour Trade.'

[3] Baltimore *Survey*, 11.

[4] Bland, *Review of the Commerce of the City of Baltimore*, 59.

[5] *Ibid.*, 98.

Another pioneer miller of Richmond was Joseph Gallego, a Spaniard. The mills bearing his name were built in 1798, and have continued to the present day. Gallego seems to have exported to the Latin American countries from the very first. As early as 1810 the Gallego brand was sold in the London market also.[5] In 1833 the mill was burned and rebuilt. The new plant consisted of a six-story mill-building containing twenty pairs of millstones, turned by four water wheels. Beside the mill-building was a four-story warehouse.[6]

Still another pioneer mill was the 'Haxall' or 'Columbian' mill founded by Phillip and William Haxall in 1809.[7] The original mill was replaced in 1831–32 by a new one, six stories high, built of brick, and containing eighteen sets of millstones. Alongside the mill was a warehouse for storing wheat and flour, with a conveyor to carry wheat to the mill and an inclined plane to take the flour to the storehouse. This mill was also located on the power canal and operated by water-power.[1]

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[1] Howe, *Historical Collections of Virginia*, 302.
[2] *Ibid.*
[3] La Rochefoucauld, *Travels through the United States*, III, 72–73.
[4] *Ibid.*
[5] Information from Warner Moore & Co., owners of the Gallego Mill.
[6] Martin, *Gazetteer of Virginia*, 193 (1835).
[7] *Northwestern Miller*, June 29, 1877.

As the Baltimore mills illustrated the advantages of localization and concentration, so those of Richmond showed the advantages of large-scale production. In 1833 there were only five mills in Richmond and Manchester [2] and in 1859 but seven,[3] and only two or three in the immediate vicinity as compared to the fifty or sixty in and around Baltimore. Yet the flour production of Richmond rivaled that of Baltimore because the Gallego mill could turn out nine hundred barrels a day, the Haxall seven hundred, and the other mills were almost as large. Until General Washburn built his Minneapolis mills, these were the largest in the country.[4] Probably they were somewhat in advance of their time, for the complaint was made in 1848 that 'there is not a regular supply of wheat to keep them at work throughout the year.'

It is instructive to compare these large-scale mills with the smaller country mills of Virginia in order to discover their relative advantages. The testimony taken by the Virginia legislative Committee on Agriculture in 1830–31 throws some light on this question.[5]

The city mills claimed that they produced a higher grade of flour than that of the country mills because of their advantages in wheat-buying. The canal along the James River brought in wheat from a distance of two hundred miles west of the city. If the crop was poor in that section, the Richmond millers bought wheat in Maryland or Delaware, or wherever it was available.[1] The country mills had neither the capital, credit, nor commercial organization to buy in this manner and hence were dependent on purely local wheat supplies. Moreover, the Richmond millers claimed that their equipment was superior, especially in the matter of wheat-cleaning machinery. Operating on a large scale, they were able to fill large export orders with a uniform product. 'A ship can come here and obtain a cargo of flour all of one brand.'[2] For all these reasons they had a distinct advantage in the export trade.[3] But the interior mills, especially those of the northern and western parts of the State, had also progressed greatly. The shift from tobacco to wheat, begun before the Revolution, had continued unabated down to 1815[4] and flour-milling had developed correspondingly.

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[1] *Hunt's Merchants' Magazine*, XIII, 585 (1845).

[2] Martin, *Gazetteer of Virginia*, 193. Manchester was a suburb of Richmond on the opposite side of the James River, which is now incorporated with it.

[3] *Hunt's Merchants' Magazine*, XXXIX, 54 (1858).

[4] *Ibid.*, XX, 53 (1848).

[5] Virginia House of Delegates, *Journal* (1831–32), Document 31.

These country millers depended mainly on the domestic market, although in some years large shipments were made to England and France. Those of the southern and eastern parts of the State sold their surplus through commission men in Richmond or Norfolk; those in the northern part of the State sent their product to Alexandria, Georgetown, Fredericksburg, or Baltimore. From these markets it was shipped all along the coast from Savannah to Portland. Before 1825 New York City had been the best market, but with the opening of the Erie Canal the Virginia millers lost ground there. The New England markets were also large buyers. And there was much flour consumed at home. 'Formerly the people used corn ordinarily and reserved wheat for high days and holidays. Now wheat flour is in common use in every farmer's house, and generally of the best quality.'[1]

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[1] Virginia House of Delegates, *Journal* (1831–32), Document 31.

[2] *Ibid.*

[3] They exported mainly to Cuba and Brazil. Greeley, *Great Industries of the United States*, 994–98.

[4] Jefferson, *Writings*, XIII, 173. Letter to President Madison, June 29, 1812. To keep up the popularity of the war two things are necessary. One is 'To furnish markets for our produce say indeed for our flour, for tobacco is already given up, and seemingly without reluctance. The great profits of the wheat crop have allured every one to it. . . .'

The struggle in Maryland between country and city millers over the inspection system in 1821–25 has its counterpart in Virginia in the following decade. At that time the flour inspected at Richmond was of two general classes: 'City Mill' and 'Canal.' The 'Canal' flour, so called because the bulk of it came to Richmond via the James River Canal, was the flour of the country mills. The two kinds of flour received the same grade from the inspectors, but the product of the city millers generally sold for a somewhat higher price. In the twenties the country millers had started to manufacture a new grade of flour which they called 'Family' flour. This was better than 'Superfine,' but, because the grade was not recognized by law, the inspectors branded it as 'Superfine' and the country millers considered themselves injured thereby. There were various other minor complaints. Some of the city millers were using two separate trade-marks for their superior and inferior flour. One of them called his inferior flour 'Canal.' The city millers were accused of combining to control wheat prices. This should have been a benefit to the country millers because it was well understood that 'the price of wheat in the country is generally regulated by the price in Richmond, deducting the cost of transportation.' But the main complaint was that they believed 'the Richmond inspectors favored the city mills unduly in their grading.'[2]

The Richmond millers, of course, denied any favoritism. Their flour, they claimed, was superior in quality and deserved higher grades and better prices. If the Richmond mills were compelled to stop using separate brands for their inferior flour, they would have to stop purchasing inferior wheat and the farmer would be the loser thereby. However, the legislative committee recommended that the appointment of the Richmond chief inspector be vested in the Governor and that the law should specifically prohibit any miller from using more than one brand-mark to indicate the mill in which the flour was manufactured.[1] In 1832 it was further recommended that the grade of 'Family' flour be established by law.[2] With this achieved, the opposition of the country millers seems to have subsided.[3]

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[1] Virginia House of Delegates, *Journal* (1831–32), Document 31.

[2] *Ibid.*

We are concerned with the struggle only as it throws light on milling conditions of the time and because of parallel controversies in other sections and periods. Thus in New York, at the end of the seventeenth century, the city merchants were attempting to monopolize the bolting privilege and the export trade at the expense of the country millers who wanted to bolt for themselves and carry on trade with other colonies and countries direct. At Baltimore in 1820 the country millers had the better wheat supplies, but felt that they were being deprived of the fruits of that advantage because the city millers, they thought, controlled the inspection system and the marketing machinery. At Richmond, in 1830, it was the city millers who produced the better product and the control of the inspection system perhaps enabled them to take full advantage of the situation.

Richmond's milling leadership arose later than Baltimore's and declined more quickly.[4] One reason for this was the

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[1] Virginia House of Delegates, *Journal* (1830–31), 215–18.

[2] *Ibid.* (1831–32), 215–18, and Document 31.

[3] Apparently there was some sentiment at this time in favor of a system of wheat inspection but the Committee opposed this. The quality of the wheat could not well be ascertained and certified before delivery, they said. 'In no view . . . do the advantages justify the expense which invariably devolves upon the farmer.' (Document 29.)

[4] Inspections of flour at Baltimore and Richmond, 1799–1858 (in barrels, annual average, five-year periods):

YEARS	BALTIMORE	RICHMOND	YEARS	BALTIMORE	RICHMOND
1799–1803..	389,523		1829–1833..	541,017	214,980
1804–1808..	345,680		1834–1838..	450,379	166,340
1809–1813..	437,011		1839–1843..	562,771	192,180
1814–1818..	335,740		1844–1848..	722,470	199,720
1819–1823..	473,340	132,720	1849–1853..	1,012,766	353,264
1824–1828..	550,542	126,120	1854–1858..	897,829 *	503,766

* Baltimore average does not include year 1858.

Baltimore figures are from *Hunt's Merchants' Magazine*, IV, 569: *ibid.*, fact that Richmond was not a widely known marketing center. Even when its great mills were at the height of their prosperity much of their flour was being shipped to Baltimore for export by the merchants of the rival city. Nor did Richmond ever draw to itself the trade of the minor milling centers of Virginia, such as Petersburg on the Appomattox, and Fredericksburg and Falmouth at the falls of the Rappahannock. Even such small and weak commercial centers as Georgetown, Alexandria, and Norfolk seemed to be able to develop an export trade of their own independent of Richmond.

Flour-milling at Richmond reached its height in the decade before the Civil War. At that time the Richmond mills were producing nearly 400,000 barrels of flour annually, and the city was second only to Baltimore, which was producing perhaps 500,000. But the Civil War cut off all foreign markets and it took Virginia a long time to recover from the conflict. Richmond's production had not reached its former level when the competition of the Western mills began to be felt. Moreover, the Richmond mills were less solidly based on a local wheat supply than those of Baltimore, since in most of Richmond's wheat area tobacco was always a possible alternative crop, and wheat production fluctuated inversely with the profits of tobacco-growing. As the domestic market declined before the inroads of the Western millers, they were faced by sterner competition from Baltimore for the Brazilian market. Here, also, they lost ground, and, by 1885, Richmond was supplying but a minor part of the Brazilian imports.[1]

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xxxi, 746; *ibid.*, xxxviii, 424; Richmond, *Hunt's Merchants' Magazine*, xix, 546; *ibid.*, xxix, 632; Edwards, *Gazetteer of Virginia*, 359 ff.; *Trade and Commerce of Richmond*, 41.

[1] Imports of flour at Brazil in 1885:

From Baltimore	227,624 barrels
Richmond	44,875
Western United States	35,126
River Plata	70,101
Other countries	19,913

(Rutter, *South American Trade of Baltimore*, 57–60.)

Though milling declined at Richmond, it did not disappear. The Haxall and the Gallego mills are in operation to-day, though now under one management. There are many good-sized mills in western Virginia — at Lynchburg, Roanoke, and Danville, and just across the border at Durham and Charlotte, North Carolina. They grind chiefly the softer wheats and sell mainly in the Southern States, though the Haxall and the Gallego mills continue to ship to Brazil and to Great Britain.[1] In the grinding of corn meal for the Gulf States market, and in the supply of the local areas in which the peculiar railroad rate system of the region gives them a decided advantage, the Virginia mills seem to have a permanent, if limited, market.

III. Milling Centers of Western New York

We have seen how, early in the colonial period, the wheat supplies of the Connecticut Valley and the Hudson replaced those of the seacoast villages of New England, and how these, in turn, were superseded by the wheat from the great interior valleys: the Susquehanna, the Shenandoah, and the James. After 1800 the next step was taken; the Alleghenies were crossed and wheat-growing was begun in western New York. New wheat areas developed new milling centers, the most important of which was Rochester in the valley of the Genesee.

The first mill built in the valley was probably that erected by a notorious desperado named 'Indian' Allen in 1789 on the site of what is now Rochester.[2] Supplies of grain must have been scarce, for the first wheat grown by white men in the region had been raised only the year before.[3] The mill itself was rudely constructed with but a single pair of millstones raised from a neighboring quarry, and could grind but ten bushels of grain a day. Yet, since it was the only mill available in all that region, settlers came to it from thirty miles around.[1] After a time other mills were built — one in 1800, between Geneva and Bath from whence flour was shipped to the Baltimore market via the Susquehanna River;[2] another in Rochester in 1807 and the famous Ely's Red Mill, also in Rochester, in 1814.[3]

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[1] Based on personal interviews with Lynchburg and Richmond millers.

[2] O'Reilly, *Sketches of Rochester*, 368–69.

[3] *The Cultivator* (Albany, 1851), VIII, 49.

There were many other mills in the towns and villages of western New York, but those of Rochester soon rose to preeminence. The water-power of the Genesee River was developed by power canals. Transportation routes into the surrounding wheat area were provided by the river itself, supplemented by the Genesee Valley Canal to the south and the Erie Canal to the west, and many turnpikes and plank-roads.[4] These transport facilities were centered in Rochester and therefore brought to that city the wheat in which the region early began to specialize. This area was extremely fertile and produced large crops of wheat of high quality. Its fertility was preserved by sensible methods of crop rotation.[5] The city had a harbor on the Great Lakes and so had access to wheat supplies from Canada[6] and the Great Lakes States as well.[7] And, lastly, Lake Ontario and the Erie Canal provided satisfactory transportation routes to world markets. The earliest Rochester mills sent flour by boat to Montreal. But after the Erie Canal was completed, the bulk of the shipments were made to the New York City market.[8]

The War of 1812 stimulated milling in Rochester, for much flour was needed to supply the troops on the Niagara frontier.[9] Then in 1815 there was a short crop in Canada and, in consequence, flour prices rose to fifteen dollars a barrel in Rochester.[1] But the big development came after the opening of the Erie Canal. The pioneer historian of the city lists five mills built between 1817 and 1821, one in 1826, four in 1827, and seven between 1827 and 1835.[2] In 1826 there were seven mills with twenty-four run of stones; in 1835 eighteen mills with seventy-eight run of stones; and in 1851 twenty-two mills with one hundred run of stones.[3] This was equivalent to about 5000 barrels daily capacity and the mills produced at that time over 500,000 barrels of flour annually.[4]

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[1] O'Reilly, *Sketches of Rochester*, 357.

[2] *Ibid.*, 368.

[3] *Hunt's Merchants' Magazine*, XVII, 46.

[4] *Ibid.*, XXV, 87–88.

[5] *The Farmers' Register*, II, 423 (1835); Michigan Board of Agriculture, *Report* (1872), 263–64.

[6] Johnston, *Notes on North America*, I, 203.

[7] Peck, *Semi-Centennial History of Rochester*, 602.

[8] Everts, Ensign and Everts, *History of Monroe County*, 33, 43–44.

[9] *Hunt's Merchants' Magazine*, XVII, 46.

Some of these mills were notably large and well-equipped. The Beach mill had sixteen pairs of millstones and could produce 500 barrels of flour a day, as also could Ely's mill; and the Acqueduct, and Hart's mill, were almost as large.[5] A description of Ely's mill, written in 1840, shows the high degree of technical development attained by Rochester mills at this period.[6] 'Mr. Ely's mill, . . . is considered as in all respects approaching the nearest to perfection of any of them. . . . It stands upon the edge of the canal. . . . A boat laden with wheat may be run alongside of the mill, the

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[1] *Hunt's Merchants' Magazine*, XVII, 46.

[2] O'Reilly, *Sketches of Rochester*, 368–70.

[3] *Ibid.*, 360–61; Everts, Ensign and Everts, *History of Monroe County*, 81; *Hunt's Merchants' Magazine*, XVI, 96; XXV, 87–88.

[4] Shipments of flour eastward by canal from Rochester (in barrels):

1844....	400,378	1848....	599,326	1852....	540,232
1845....	518,318	1849....	570,757	1853....	518,318
1846....	540,232	1850....	590,326	1854....	400,378
1847....	631,574	1851....	631,574		

(*Hunt's Merchants' Magazine*, XXII, 328–29; XIV, 96; XVIII, 306.)

There are no exact figures available for the actual output of the Rochester mills. To the above figures should be added some 20,000 barrels shipped out by rail (during the suspension of navigation), about 80,000 barrels for home consumption, and several thousand shipped via Lake Ontario. On the other hand, some of the shipments of outside mills are doubtless included in the above figures. In 1850 the Rochester mills are said to have used 2,442,825 bushels of wheat indicating a production of about 540,000 barrels of flour. (*Hunt's Merchants' Magazine*, XVIII, 306.)

[5] Hazard, *United States Register*, III, 224.

[6] Samson, *Scrapbooks*, CXXV, 86. See also Hazard, *United States Register*, III, 224.

wheat shoveled into a chain of ascending buckets and carried through every process of cleaning, grinding, cooling, bolting and being conveyed into the barrels, into which it is pressed by the machinery, ready for the cooper, as the last office, to clap on the head. And the wheat is carried through all the different processes by being handled but once. First, it is carried up into the fifth or topmost loft, where it goes through one machine to fan out the remaining chaff. It goes through another machine to be separated from chess and cockle. It is then carried through another which cleanses it of the smut, if any. It then descends into the hopper, and being ground, it goes into the bolters, whence it passes into the buckets again and is carried into the cooling chambers . . . and brought down cool, superfine flour. . . .'

The gradual widening of the area from which the Rochester mills drew their wheat supplies has been described above. We can say with some confidence that in 1850 the great bulk of the wheat supplies were still coming from within the State boundaries. After that date, however, the competition of the Western miller and the Western wheat-grower began to be felt.[1] New York's wheat production was barely keeping pace with the growth of the population of the State, and the increase in the arrivals of wheat at New York City (1836–43) was solely due to increased arrivals of Western wheat.[2] The extent and sources of the shipments of Western flour by that time may be judged from the table given below.[3] After 1850 there was a series of crop failures in

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[1] Johnston, *Notes on North America*, I, 203.

[2] *Hunt's Merchants' Magazine*, XI, 140.

[3] Flour and wheat traffic of the Erie Canal.

Delivered at Eastern terminals: flour 1,805,135 barrels; wheat 1,395,195 bushels.

	FLOUR	WHEAT
Entered canal from Lake Erie....	649,970	1,467,904
From Ohio....................	505,262	725,075
From Michigan................	112,215	97,249
From Indiana.................	13,726	48,279
From Illinois................	2,259	10,634
From Wisconsin...............	166	.....

(*Messages from the Governors*, III, 893 (1841).)

western New York,[1] and wheat-growers were in a state of depression. Western competition and higher land costs, they claimed, were driving them out of business.[2] For a time the Rochester mills imported large quantities of Canadian wheat in spite of a duty of twenty per cent. To the British observer who noted this, it was a mystery how the Rochester millers could buy wheat in Toronto, pay transportation charges and import duties, mill it into flour, and sell the flour in New Brunswick or Nova Scotia in competition with Canadian mills.[3] At any rate, the situation created a demand for reciprocity on the part of Canadian farmers, which was supported by the Rochester millers, but opposed by the wheat-growers of the Genesee Valley.[4]

Apparently the Canadian territory could not be relied upon permanently for wheat supplies, for the Rochester millers soon turned to other regions. At first they bought mainly in Ohio and Michigan, then in Illinois and Indiana, and after 1870 in Wisconsin and Minnesota.[5] In 1877 a Rochester writer comments: 'The city of Winona [Minnesota] must be an immense grain depot, as nearly all the mills procure their spring wheat for the Haxall process from that point. Many have buyers there making purchases for them.'[6]

We can touch on the marketing situation only briefly. As early as 1838 the Rochester millers had established marketing agencies in all the Eastern cities from Quebec and Montreal, through Bangor, Boston, and Hartford to Washington, Charleston, and New Orleans. New York City was the principal market and from that port large shipments were made to foreign ports.[7] To that city the millers were accustomed to ship to commission merchants on consignment. At times they had considerable quantities of flour in storage in warehouses there. In 1837 there was a riot in that city due to the ill-feeling caused by rapidly rising bread and flour prices,[1] and one of these warehouses was sacked by the mob. The Rochester millers memorialized the Legislature for reparation, saying 'from the character of our business and the position of that city [New York] we necessarily have almost constantly large stocks of flour in the warehouses there, it being the depot from which supplies are purchased and forwarded to the different parts of our own and foreign countries.' They asked that the city be held responsible for the damage done by the mob, and insisted that the high price of flour was not due to any monopoly on their part, but solely to a severe crop failure. They denied that they were speculating or profiteering, and claimed that even at the high prices then prevailing they could not make a fair profit.[2]

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[1] Peck, *Semi-Centennial History of Rochester*, 602.

[2] *Hunt's Merchants' Magazine*, XVI, 559.

[3] Johnston, *Notes on North America*, I, 203.

[4] *Ibid.*, I, 212.

[5] Everts, Ensign and Everts, *History of Monroe County*, 117.

[6] *Ibid.*

[7] O'Reilly, *Sketches of Rochester*, 360–61.

Nevertheless, the local historians emphasize the speculative character of the milling business in those days. Up to about 1839 prices were rising, especially during the period of monetary inflation (1836–39). The millers shipped large quantities of flour to New York City, with the export business as their principal aim. With rising demand and high prices, flour sold easily for a time — then demand fell off, prices dropped, and some of the millers were ruined financially.[3] Complaints were made against the commission men,[4] but these seem to have been only temporary. As the effects of Western competition began to be felt, complaints were made against the wheat-buyers in the smaller centers of western New York, who, it was claimed, bought up all the choice wheat and shipped it to New York City.[5] But after 1860 the chief complaints were against the railroads. 'There were whole seasons,' it was claimed, 'when flour could be shipped from St. Louis to tidewater for one fourth the cost per car of the cost from Rochester.'[1] To this situation they attributed the decline of Rochester as a milling center and the rise of St. Louis, and later of Minneapolis, to milling leadership.

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[1] Land speculation, currency inflation, and crop failures were chiefly responsible.

[2] O'Reilly, *Sketches of Rochester*, 365.

[3] Everts, Ensign and Everts, *History of Monroe County*, 116.

[4] Peck, *Semi-Centennial History of Rochester*, 602.

[2] *Samson Scrapbooks*, CIV, from *Rochester Herald*, February 7, 1904.

This was, of course, a superficial view. As the Genesee Valley farmers turned away from staple wheat-growing to other more profitable methods of farming,[2] the Rochester millers had to rely to a greater and greater extent on Western wheat supplies. These the Western millers could purchase to greater advantage, the 'New Process' enabled the Westerner to mill the hard spring wheats to better advantage,[3] and the railroad rate system was such as to favor flour shipments as against wheat. Between 1870 and 1890 the Minneapolis millers enlarged their scale of operations so greatly that the Rochester mills were (by comparison) small-scale and inefficient plants.[4] By 1893 the Rochester mills still claimed superior advantages in water-power, superior shipping facilities, larger and more varied wheat supplies, lower production costs (lower wages, cheaper barrels), and lower rates to the New York market.[5] But the water-power was no longer sufficient to operate all their plants, so that expensive auxiliary steam plants were necessary.[6] Some of the other advantages enumerated above were equally dubious. By 1893 several of the smaller mills had been destroyed and not rebuilt. In the next decade, four of the larger mills ceased operations and production dropped off nearly a third. The output was still greater than that of the pre-Civil War years, but far smaller than that of Minneapolis, St. Louis, or Milwaukee.[7] Since 1904 it has slowly declined, the falling-off coinciding with the rise of milling at Buffalo. In recent years the output has been about equal to that of pre-Civil War years. Rochester is still important in flour production — somewhat more so than either Richmond or Baltimore — but is no longer one of the chief centers.[1] Railroad rates more favorable to flour than to wheat, the continued westward movement of wheat-growing, the rise of new centers with equal or superior natural advantages, the decline of wheat-growing in the area immediately tributary to the city as more profitable methods of farming were developed: these rather than rate discriminations were the chief causes of decline.

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[1] Peck, *Semi-Centennial History of Rochester*, 602.

[2] Everts, Ensign and Everts, *History of Monroe County*, 117.

[3] *Samson Scrapbooks*, LI, 87, *The Rochester Post-Express*, summer of 1887.

[4] *Ibid.*, LI, 99. *n.d.* (about 1887).

[5] *Ibid.* See also LII, 32, *The Rochester Union and Advertiser*, October 21, 1893.

[6] *The Northwestern Miller*, July 28, 1893, p. 125.

[7] *Samson Scrapbooks*, LXV, 44. *The Rochester Democrat and Chronicle*, January 2, 1901.

Turning now to the other milling and marketing centers of western New York, we find that there were several centers of some little note in the period before 1860. We can give space to only a few of these.

(*a*) *Buffalo* did not begin to receive grain from the West until 1839, except some small shipments from Lake Erie ports. In that year there was a receipt of thirty-nine sacks of wheat from Chicago, consigned to a miller in Otsego County. After that, the trade grew so rapidly that between 1850 and 1856 receipts of grain varied from twelve million bushels to twenty-six million. To store this grain and to transfer it from lake steamer to canal barge, the first elevator was built in 1842.[2] By 1858 there were twelve elevators with a capacity of 2,230,000 bushels.[3] In 1857, was begun the development of Niagara power,[4] so that Buffalo had visions

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[1] Rochester Flour Mills:

Macauley-Fien Milling Co..................	150	Bbls. Cap.
Moseley and Motley Milling Co............	800	" "
Van Vechten Milling Co....................	450	" "
Geo. W. Wittmann Milling Co.............	50	" "
Sperry-Gerrard Milling Co.................	100	" "
Total..............................	1550	" "

Millers' Almanack (1926), 130.

[2] *Northwestern Miller*, August 5, 1885, p. 581.

[3] *Hunt's Merchants' Magazine*, XXXVIII, 692 (1858). See also *ibid.*, XXXV, 760.

[4] *Northwestern Miller*, December 2, 1881, p. 395.

of being a milling center as well. There seem to have been a number of fairly large mills in the city and vicinity before 1860, but Buffalo's leadership in milling did not come until after 1900. In the period under discussion the city owed its importance in the trade mainly to its storage facilities for Western wheat and flour and to the merchants who handled them. Of the receipts of wheat and flour indicated above, it was estimated that fully half changed hands in the Buffalo market.[1]

(*b*) *Oswego* had a situation which in many respects rivaled that of Rochester. It had a fine water-power, and, although not so securely based on the grain regions of western New York, could import grain via Lake Ontario from Canada and the West. A branch canal, connecting with the Erie at Syracuse, gave Oswego a canal route to the New York market. In 1840 the mills had forty-two run of stones as compared with Rochester's ninety. The Oswego mills were then getting wheat from Illinois, Michigan, and Ohio through the Welland Canal. Vessels could run alongside the mills and unload their wheat cargoes while the manufactured flour was being loaded at the other side of the mill into canal boats.[2] On the whole, the Oswego mills were more dependent on Western wheat than were those of Rochester and shipped more flour to the Canadian markets.[3] After the opening of the Boston and Albany Railroad in 1842, the Oswego shipments to Boston became prominent also.[4] By 1859 Oswego claimed sixteen mills with eighty-eight run of stones and nine thousand barrels daily capacity. With the mills in the neighborhood of the city counted in, it was claimed that Oswego could produce a million barrels annually.[5] For a few years after 1850, Oswego passed Rochester in production. A considerable trade in Western and Canadian flour had been

[1] *Hunt's Merchants' Magazine*, XXXVIII, 692 (1858).

[2] Hazard, *United States Register*, I, 255.

[3] *Hunt's Merchants' Magazine*, V, 287 (1840).

[4] *Ibid.*, XL, 549 (1859).

[5] *Ibid.*, XL, 549 (1859).

built up also,[1] but this trade was a precarious one, shifting from year to year and, on slightest excuse, to other ports. Milling leadership was also built on a more precarious foundation than that of Rochester as has been shown above. Hence Oswego's decline, though due essentially to the same causes, was the more sudden and the more complete. In 1864 the largest mill was burned down and it was not rebuilt.[2] In 1879, four more passed in the same way,[3] and in February, 1922, was recorded the destruction of the last of the Oswego mills.[4]

(*c*) *Albany and Troy* may well be considered together. The lower end of the Mohawk Valley was famous for its wheat before the Revolutionary War. The Swedish traveler Kalm says that the Dutch and German settlers in that region raised great quantities of wheat, manufactured it into flour, and then shipped it to New York City. 'The wheat flour from Albany is reckoned the best in all North America, except that from Sopus or Kingstown, a place between Albany and New York. . . . At New York they pay the Albany flour with several shillings more per hundredweight than from other places.'[5] The mills seem all to have been small ones, depending chiefly on the local wheat supplies and they did not survive the building of the Erie Canal when the wheat of the West drove Mohawk Valley farmers into other lines of agriculture. Only at Troy (because of its water-power) did milling survive to any extent. Albany, however, continued to be an important flour market, its merchants acting

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[1] Oswego wheat and flour trade:

	1849	1850	1851
Flour receipts by lake......	317,758 (bbls.)	302,577 (bbls.)	389,929 (bbls.)
Received from Canada....	198,623	260,874	259,825
Wheat receipts by lake.....	3,615,677 (bu.)	3,847,384 (bu.)	4,231,899 (bu.)
Received from Canada....	623,920	1,094,444	670,202

(Andrews, *Trade and Commerce of the British North American Colonies*, 77.)

[2] *Northwestern Miller*, June 18, 1924, p. 1194.

[3] *Ibid.*, August 1, 1879; October 3, 1879.

[4] *Ibid.*, February 1, 1922.

[5] Kalm, *Travels into North America*, II, 245–46. See also *Hunt's Merchants' Magazine*, XXI, 51 (1849). For Esopus, see above, p. 15.

as middlemen between the smaller mills of western New York and the merchants in New York City.[1]

IV. The Eastern Flour Markets

The westward spread of the flour-milling industry necessarily brought about changes in the marketing organization of the industry. As milling became more localized, the flour trade grew relatively more important. The distribution of flour over wide areas came to be concentrated in a few large commercial centers. At the end of the colonial period Philadelphia had become the leading marketing center. The period 1790–1860 saw the rise of new centers in Baltimore and New Orleans, saw New York City regain the leadership and Boston become the chief distributing center for the New England States.

(*a*) *Boston.* New England, as we have seen, was partially dependent on other sections for its foodstuffs as early as 1750. Its only important food-producing region — the Connecticut Valley — was buying some grain and flour by 1800. In the following decades the increasing industrialization of New England intensified this situation. When Jefferson placed the embargo on foodstuffs in 1807, special arrangements had to be made to insure regular shipments to Massachusetts, from whence, presumably, they were distributed to the other States.[2] By 1835 even the farmers along the border of New York, who, up to that time, had been selling flour and wheat at Albany and Troy, were beginning to buy Rochester flour and the Maine Legislature was passing a law to stimulate wheat-growing.[3] In the next two decades there was a decided revival of flour-milling in Massachusetts so that production jumped from 63,200 barrels in 1845 to 263,100 barrels in 1855.[4] But in the same period the receipts of flour

[1] *Hunt's Merchants' Magazine*, XXI, 229 (1849).

[2] Jefferson, *Writings*, XII, 51, 52–53, 95, 210. Letters to the Governor of Massachusetts, to Secretary Gallatin, etc., May to December, 1808.

[3] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 237.

[4] Massachusetts, *Statistics*, 1845; *Industry of Massachusetts*, 1855.

at Boston increased from 730,000 barrels to over a million barrels,[1] showing that, in spite of the milling growth, the State was becoming increasingly dependent on outside sources. Since shipments came mainly by water, up to 1860, the trade tended to be concentrated in the seaport towns. Comparing two typical years, 1839 and 1859, one is struck by the increasing diversity of the sources of supply.[2] At the beginning of the period the chief receipts were from the Southern mills; then the mills of western New York had taken the lead. By 1859 Virginia and Maryland mills were still holding their own, but the Genesee flours (Rochester and Oswego) were losing ground before those from the Middle West, particularly from St. Louis. Much flour was also coming from Ohio and from Canada.[3] When the Civil War cut off

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[1] *Hunt's Merchants' Magazine*, xx, 215. Boston Board of Trade, *Fourth Annual Report*, 135.

[2] Boston receipts:

	1839 (Bbls.)
From New York City...	153,450
Albany..........	39,986
Hudson.........	105
Richmond.......	55,086
Fredericksburg...	26,666
Alexandria.......	14,025
Petersburg.......	12,917
Georgetown......	6,347
Norfolk.........	3,576
Baltimore........	61,093
New Orleans.....	47,871
Philadelphia......	25,872
Scattering.......	.....
Total.......	451,667

	1859 (Bbls.)
By railroads	
Western.......	266,452
Northern......	96,469
Fitchburg.....	45,908
Boston & Maine	6,808
From New York City.	64,667
Albany........	810
New Orleans....	153,045
Fredericksburg..	6,450
Georgetown....	8,307
Alexandria.....	12,162
Richmond......	49,945
Philadelphia....	112,519
Baltimore......	133,533
Portland.......	74,173
Charleston.....	2,418
Delaware......	6,472
Norfolk........	3,482
Scattering......	....
Total......	1,049,186

(Hazard, *United States Register*, II, 95; Boston Board of Trade, *Sixth Annual Report*, 62–63 (1860).)

[3] Boston Board of Trade, *Fourth Annual Report* (1858), 134–35, re-

the Virginia supplies, the Western flour gained almost a monopoly of the Boston market.[1]

Most of the Western flour is represented in the table below as being shipped from New York, Philadelphia, Baltimore, and even Charleston, as well as New Orleans. Boston tried to draw these Western supplies more directly by building the Western railroad.[2] In part the plan was a success, but it seems also to have diminished Boston's trade by creating other distributing centers in New England. In 1858 the Boston Board of Trade complained that the facilities offered by the Northern and Western railroads had cut off much of the large New England trade in flour and grain which formerly centered there.[3]

Thus, while Boston's domestic flour trade was steadily growing in volume, the merchants of that city were fighting to hold the tributary territory against the encroachments of rival distributing centers, and the efforts of smaller centers to become independent and import their own supplies. The great growth of Boston as a flour market came as a result of the development of the Northwestern mills after 1870. The same was true of Boston's export trade. By 1850 there was a fairly large export of flour to South America and the Maritime Provinces of Canada and this was to increase rapidly after 1860.[4] The Boston Board of Trade complained, however, that this trade was handicapped by unsatisfactory

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ports that the market has received very good family extras from Ohio, Michigan and Canada, but 'Old-fashioned Genesee family flour has almost disappeared from the market.'

[1] Boston Board of Trade, *Eighth Annual Report*, 72–73 (1862).

[2] Andrews, *Trade and Commerce of the British North American Colonies*, 298–99.

[3] Boston Board of Trade, *Fourth Annual Report*, 75–76 (1858).

[4] Boston flour exports, 1852–60:

1852	269,771 (bbls.)	1857	184,597 (bbls.)
1853	382,305	1858	196,862
1854	188,353	1859	164,875
1855	159,084	1860	234,613
1856	198,081	1861	389,730

(Boston Board of Trade, *Eighth Annual Report*, 73, (1862).)

transportation facilities and discriminating rates which made it impossible to draw to Boston the flour output of the Great Lakes region and Canada.[1]

(*b*) *Philadelphia.* Philadelphia continued in this, as in the colonial period, to be an important milling center. In 1856 there were sixteen mills in or near the city with sixty-eight run of stones,[2] and in 1858 the Board of Trade estimated a flour production in Philadelphia and vicinity of 750,000 barrels.[3] At the same time Philadelphia was drawing large supplies from interior mills of Pennsylvania, Delaware, and Maryland. The city was not getting as large a share of the Western flour, however, as the merchants felt they should. They tried to build up the city of Erie as a rival port to Buffalo and plans were made for a railroad into the Genesee Valley and to Lake Ontario.[4] The chief weakness, however, was a lack of banking capital. By this time both Boston and New York were stronger banking centers than Philadelphia.[5]

The weakness of Philadelphia in this period shows up most plainly in the export trade. From 1831 to 1845, with some considerable fluctuations, flour exports were practically stationary,[6] and below the totals of the colonial period. After that there was a considerable increase. Doubtless the

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[1] Boston Board of Trade, *Fourth Annual Report*, 75–76 (1858).

[2] *Hunt's Merchants' Magazine*, XXXIV, 635 (1856).

[3] *Ibid.*, XLI, 220 (1859).

[4] *Hunt's Merchants' Magazine*, XXXIX, 188–89 (1858).

[5] *Ibid.*, XXXIII, 57 (1855). An English writer who visited Philadelphia about this time (1855) attributed the relatively slower growth of Philadelphia to three things: (1) the superiority of the Erie Canal to the Pennsylvania canals; (2) the premature efforts to exploit the mineral wealth of the State which drew capital away from commerce and transportation where it was most needed; and (3) the failure of the Second United States Bank.

[6] Philadelphia flour exports, 1831–1855, in barrels, annual average five-year periods.

1831–35	145,665	1846–50	254,122
1836–40	129,914	1851–55	330,817
1841–45	176,065		

(*Hunt's Merchants' Magazine*, VI, 81; XIX, 200; XX, 216; XXXVIII, 349.)

comparatively slow growth of Pennsylvania's railroads was the chief hindrance to development in the earlier decades, and the completion of the Pennsylvania line from Philadelphia to Pittsburgh in 1852,[1] making possible large receipts of Western flour, a chief cause of rapid growth after that date.[2] Since Pennsylvania, more than any other Eastern State, continued to be a large manufacturer of flour, Philadelphia could not attain as important a distributing trade in its own metropolitan area as did Boston in New England; because of its natural disadvantages as a seaport it lost ground in the export trade before Baltimore and New York City.

(*c*) *New York City.* At New York City flour production seems to have declined and disappeared by 1800.[3] In part this was due to the drying-up of local sources of wheat supply, as the farmers near the city found more opportunities for profit in truck-farming. In part it may have been due to destructive competition from larger and more efficient mills in newer centers. The Census of 1840 lists no mills or flour production in the city. But in 1842 John Hecker built a small mill, which was the beginning of the Hecker-Jones-Jewell Company, one of the outstanding present-day milling concerns.[4] In 1853 Hecker built another and larger mill in the city,[5] and by 1860 there were six mills with a capital of $272,800 and a product valued at $2,612,500.

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[1] Ripley, *Railroads: Rates and Regulation*, II.

[2] Philadelphia flour receipts, 1858:

Brought by:	(Bbls.)	Brought by:	(Bbls.)
Penna. R.R. (through)	403,400	Reading R.R.	38,193
Penna. R.R. (way)	146,876	Schuylkill navigation	41,300
Ches. & Del. Canal	147,436	Est. receipts coasting vessels	100,000
Phil. Wilm. & Balt. R.R. (local)	2,056	Receipts from Richmond	23,477
Phil. Wilm. & Balt. R.R. (through)	162,519		

(*Hunt's Merchants' Magazine*, XLI, 220.)

[3] Winterbotham, *View of the American United States*, II, 336–38 (1799), mentions bread manufacture in New York City, but no flour.

[4] *Northwestern Miller*, July 30, 1924, p. 431.

[5] A writer of the time suggested the following reasons for renewed mill-building: 'The necessity and advantage of these places for the manufacture of flour nearer home are becoming more felt at the North, and frequent adulterations which have been made in this staple have turned the attention of the people here to the manufacture of an article which

But it was as a flour-marketing center that New York City made most notable progress. The growth of Rochester and Oswego brought enormous supplies of flour to the New York market. From the completion of the Erie Canal to that of the trunk-line railroads to rival centers (1825–50), New York received the flour of all the tributary Great Lakes territory as well. As far as the New York State mills were concerned, this resulted naturally from the position of New York City as the commercial metropolis of the State. For the West in general, it arose partly out of the transportation routes built up by the Erie Canal and partly out of New York City's financial supremacy. As to transportation, it was claimed in 1855 that wheat could be carried from the Wabash to New York City by the canals at as low a freight as would be charged to New Orleans,[1] and that, by the northern route, there was less danger of waste or of loss due to the overheating of the product. But the chief reason for the trade being drawn toward New York was that city's financial leadership. 'Last Autumn,' said a Southern writer in 1854, 'the rich regions of Ohio, Indiana and Illinois were flooded with bank-notes of the eastern states, advanced by the New York houses on produce to be shipped by them by way of the canals in the Spring. These moneyed facilities enable the packer, miller and speculator to hold on to their produce until the opening of navigation in the Spring and they are no longer obliged, as formerly, to hurry off their shipments during the Winter by way of New Orleans in order to realize funds by drafts on their shipments. The banking facilities at the East are doing as much to draw trade from us as the canals and railways which eastern capital is constructing.'[2]

The process by which the New York City merchants financed the Western flour manufacturers is well described

shall be pure and wholesome and may be obtained fresh for daily use by the masses of the metropolis.' (*Northwestern Miller*, May 6, 1925, p. 549.) Quoted from *Gleason's Pictorial Drawing Room Companion*, May 14, 1853.

[1] Edwards, *Gazetteer of Virginia*, 145.

[2] *Ibid.*, 145 (1855).

by a writer of 1840.[1] That year over a million barrels of flour had been sold in New York City. 'To purchase wheat for this great quantity requires a vast capital, greater than even those engaged in the business, rich as they are, are enabled to supply. The purchase of wheat, the sale of the flour, and the raising of funds are, therefore, very important branches of the business. The raising of funds is accomplished mainly in this way. The millers first select their agent in New York with whom they make arrangements for the raising of money. This is done by placing in the hands of the agent ample security, by mortgages on the mills and personal security; a credit is thus established for fifty or a hundred thousand dollars from the New York merchant who comes under a stipulation to accept drafts for the sum agreed upon, at usually sixty or ninety days, and this before a bushel of wheat is purchased, or a barrel of flour ground. These drafts are made at the pleasure of the drawer and the internal banks, mostly at Rochester, Buffalo, Canandaigua, Utica and Albany, discount these drafts. Their bank-notes are received, with which the purchases of wheat are made by agents at different points in New York, Ohio, Pennsylvania and Michigan. The banks are benefitted by the circulation of their bills. The miller obtains his wheat. The canals, manufacturers and commission merchants are all benefitted and the consumer is not injured. The commission merchants who receive this million of barrels of flour, are confined to a very few, not probably, exceeding ten in number. They must necessarily be men of good credit and great means as they are during the year under acceptances, one way or another, for eight or ten millions of dollars. Their commissions on this large calculation of nine million at two and a half per cent is two hundred and twenty five thousand dollars — a large sum for the millers to pay — and a liberal sum — but not too much for the merchant to receive for the hazard he has to run — the advances he has made and the services performed.'

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[1] *Maryland Pocket Annual for 1840*, 75-77.

The leadership of New York City is apparent from a study of the comparative receipts and shipments of the leading ports.[1] By 1845–46 New York City had outdistanced all her rivals, and for a generation this leadership was undisputed.

V. SUMMARY

The distinguishing feature of the period from 1790 to 1810 is the rise of considerable milling and marketing centers. At the beginning of the period commercial wheat-growing had developed in a considerable area of which Philadelphia was the center. In that area were the leading merchant mills of the country, especially on the Brandywine and the Wissahickon, tributaries of the Delaware River. Hence Philadelphia was our principal flour market.

With the gradual southward extension of this wheat belt, Baltimore and Richmond became important flour centers. Baltimore had the advantages of a fine water-power, a location at the head of Chesapeake Bay, which drew to it the trade of the Tidewater region, a favorable position with respect to communication with the new wheat areas of the Ohio Valley, and a number of entrepreneur-millers of unusual enterprise and skill. When Oliver Evans brought in his new milling methods, the Baltimore millers seem to have been quicker to take advantage of them than any others and, in consequence, Baltimore took the lead as a manufacturing center. With this she combined a great export trade to the West Indies and South America so that she became a marketing center as well.

About 1820 Richmond became important as a milling center. Her chief advantages were the water-power of the

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[1] Flour receipts and exports at four leading ports, 1845, 1846 (in barrels):

	Receipts		Foreign Exports	
	1845	1846	1845	1846
New Orleans...	599,836	1,020,816	79,266	372,112
Baltimore......	563,632	794,105	238,900	516,504
Philadelphia....	475,449	753,252	201,956	364,812
New York......	1,963,150	1,548,394	469,520	1,193,428

(*Hunt's Merchants' Magazine* XIV, 190.)

James River and the wheat supplies of the James Valley and the interior valleys of Virginia. Just before the Civil War, Richmond was drawing wheat from eastern Tennessee, western North Carolina, and northern Georgia. Her mills were the largest of the time and the first to illustrate the advantages of large-scale production. But she lacked the harbor and the foreign-trade organization that Baltimore had. Hence Richmond never became an important flour-marketing center.

About 1840 Rochester came to the front. A fine water-power, a rich wheat-raising country immediately tributary, a fine system of transportation both into the wheat area and to the New York market were the advantages she possessed. The growth of Rochester meant also the growth of New York City as a marketing center, and the position of leadership which that city had lost to Philadelphia was once more regained. As she outgrew the local wheat supply, Rochester was able to tap new areas of supply through the Great Lakes and the New York Canal system. But other New York State cities had the same advantages, and so the growth of Rochester was checked by the rise of Oswego, Troy, and Albany as manufacturing centers. Albany was also a marketing center subsidiary to New York City and drawing to itself the flour of the country mills roundabout. Rochester, however, never developed a marketing organization at all commensurate with her manufacturing power.

The West followed its shipments of wheat with others of flour. The rise of wheat-growing in the West necessarily caused the rise of milling in that region. At first this was only to provide local supplies, but, when production had advanced to the point where there was a surplus, shipments were made to Eastern and foreign markets also. Again large-scale commercial milling gave rise to new flour-milling centers. These will next be considered.

CHAPTER III

THE RISE OF FLOUR-MILLING AND WHEAT-GROWING IN THE MIDDLE WEST AND THE CHANGES IN MILLING METHODS PRIOR TO 1870

THE opening to settlement of the prairies of the Middle West brought important changes both to wheat-growing and to flour-milling. New wheat varieties were introduced, new methods of milling perfected, and new milling centers developed. We begin, therefore, with the changes in wheat varieties and wheat-growing methods which new lands and new climatic conditions made necessary. Next we shall study the new milling centers, especially St. Louis in the winter wheat area and Milwaukee and Chicago in the spring wheat region, and end with a consideration of the changes in milling methods and processes. To consider this last topic adequately it is necessary to describe the milling machinery and methods of the colonial period and the changes associated with the name of Oliver Evans. The revolution in milling methods which gave us 'Patent' flour came after 1870 and so is reserved for treatment in the following chapter.

I. THE RISE OF WHEAT-GROWING IN THE MIDDLE WEST

There are in the United States to-day some five distinct types or classes of wheat which are recognized commercially.[1] They are grown in distinct areas of the country, have different qualities and values for milling purposes, and are graded separately.

(1) *Hard-Red Spring* wheat is grown in an area that stretches from Maine to Washington and from Colorado to beyond the Canadian border. But the main area of production to-day is Minnesota, the Dakotas, and eastern Montana.

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[1] Ball and others, 'Wheat Production and Marketing,' *Yearbook of the Department of Agriculture* (1921), 122–26.

There are many different varieties of this grain, but probably two thirds of the crop at present is made up of the Marquis wheat.

(2) *Durum* wheat is grown chiefly in the western part of the red-spring-wheat area. It is better suited to the drier regions and shows greater resistance to the black stem rust. Whereas the red spring wheat comprises about a fourth of the total wheat acreage, Durum makes up perhaps a sixteenth. Red Spring is a bread flour; Durum wheat is used mainly for macaroni and similar products, and is very largely exported.

(3) *Hard-Red Winter* wheat is grown in the central States from Illinois westward through the Great Plains area. It is sometimes spoken of as Kansas wheat, since the chief producing area extends from Nebraska and Iowa southward to Texas, Colorado, and New Mexico, with Kansas as the center. Like the Durum, it is a relatively late importation, for Kansas wheat was not developed until after 1890. To-day, however, it includes perhaps a third of the total wheat acreage of the country. Turkey, Kharkof, and Kanred are the chief varieties. Hard-red winter and hard-red spring are our chief bread wheats.

(4) *Soft-Red Winter* wheat is the staple type in our oldest wheat areas. It is grown from Delaware to Texas, the chief producing areas extending in a wide belt from Delaware, Maryland, northern Virginia, and southern Pennsylvania, through Ohio and Indiana, southern Illinois, and central Missouri to the eastern part of Kansas. About thirty per cent of our wheat acreage is sown to soft-red winter. There are many different varieties, Fultz, Fulcaster, Mediterranean, and Red May being the oldest and best known. This wheat is used both as a bread flour and for pastry. When used for a bread flour, however, it is usually mixed with the harder varieties.

(5) *Common White* and *White Club* were formerly graded separately, but since 1922 have been combined by the Department of Agriculture in a single grade. The Common

White is the chief type grown in the Genesee Valley region to-day, but it is also grown largely on the Pacific Coast. There are many varieties of which the Pacific Bluestem is most important. The Common White wheat is said to outyield all other varieties on the Pacific Coast. It is a soft, starchy wheat, more valuable for pastry flours and breakfast foods than for a bread flour. In the last few years, however, the Bluestem has been brought forward as a bread flour also. The White Club is grown only in the Pacific Coast States and chiefly in western Washington. This also is a soft wheat which produces weak, starchy flours used for pastry or exported to the Oriental and South American markets. Together the two occupy perhaps five per cent of the wheat acreage of the country.[1]

Of these five classes only the two soft winter types were grown to any great extent in the United States in the period before 1860. At the end of the colonial period the white varieties seem to have been most popular, especially in the regions about Baltimore, Richmond, and Rochester.[2] As the wheat area advanced westward the popularity of the red varieties increased.[3] Of the red wheats, the Mediterranean was said to make a stronger flour than the white wheat; because of its strength it would absorb more water and make more bread, its only drawback being that the flour had a slight orange tinge.[4] Moreover, it was claimed that the red wheats were more hardy than the white.[5] Because of its hardiness and early maturity, the Mediterranean was more immune to rust and insects. The millers opposed its introduction for a time because it would not yield as much or as white a flour. Hence the writer of the Agriculture Report of 1850 comments: 'The intrinsic value of flour for nutrition probably has very little influence on the market price of the article. Seeds that contain a large per cent of starch, which is whiter than gluten, and have a white and thin cuticle, or bran, are uniformly preferred by the millers. Such grain yields the maximum of superfine flour.'[1] In spite of the millers' opposition, the red varieties continued to be grown. The millers gradually learned to work them to better advantage and, after St. Louis became the chief milling center, we hear of no other wheat in all the region tributary to that city.

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[1] Ball and others, 'Wheat Production and Marketing,' *Yearbook of the Department of Agriculture* (1921), 122–26.

[2] *Farmers' Dictionary*, 298 (1846).

[3] *United States Patent Office Reports*, 1850, part II, *Agriculture*, 1–7.

[4] *The Cultivator*, VIII, 314, 346 (1850).

[5] *Northwestern Miller*, September 16, 1881, p. 202.

Besides the two varieties just mentioned there was a third that was being grown, to some extent, in those regions where the severity of the climate made winter wheat an uncertain crop. This was the red spring. We have shown that it was grown to some extent in New England in colonial times.[2] In 1850 the only section of the country which preferred the spring variety to winter was New England,[3] though it is probable that it was grown sporadically in other sections, being planted after a winter wheat crop had been frost-killed.[4] It seems to have been tried extensively in New York State about 1815, but given up because subject to the attack of the Hessian Fly. About 1838 there was a revival of spring wheat-growing in western New York after two successive winter wheat crops had failed.[5] The attitude of the agricultural papers toward it at that time is indicated by the following quotation from *The Farmers' Register* for 1838. 'The last prevailing humbug is spring wheat. Of the value of this newly introduced, or rather re-introduced old variety — for spring wheat is no novelty to well-informed agriculturists — we have before intimated our distrust. Nevertheless, hundreds are eagerly seeking seed of spring wheat at four and five dollars the bushel. . . .'[6]

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[1] *United States Patent Office Reports*, 1850, part II, *Agriculture*, 1–7.

[2] See above, p. 4, 7.

[3] *United States Patent Office Reports*, 1850, part II, *Agriculture*, 1–7.

[4] *Farmers' Register*, v, 72 (1837).

[5] *Ibid.*, 310–11.

[6] *Ibid.*, VI, 50–55 (1838).

The pioneer farmers in northern Illinois, Iowa, Wisconsin, and southern Minnesota seem at first to have tried winter wheat, but frequent crop failures, due to winter-killing, discouraged these efforts. In 1851 *The Cultivator* contained many complaints from Illinois and Iowa farmers on this score. They were beginning to doubt whether the prairie country would ever be a winter wheat region.[1] The same was true in Wisconsin.[2] The ill-success of the first efforts to grow winter wheat in Minnesota will be considered presently.[3] So the pioneer farmers in this area turned to spring wheat. By 1858 almost two thirds of the wheat marketed at Chicago was of the spring variety.[4] At that time, the Ohio wheat-growers were complaining that the Buffalo jobbers were mixing the Northwestern spring wheat with the Ohio winter wheat, thus getting a higher price for the spring wheat, they claimed, but damaging the reputation of the Ohio wheat and flour.[5]

The Census of 1870 for the first time gives separate figures for spring and winter wheat. By that time Illinois, Iowa, Ohio, Indiana, and Wisconsin had become our leading wheat-growing States with Minnesota in seventh place. In Indiana practically all the crop was winter wheat; in Illinois winter wheat predominated, there being nineteen million bushels of winter wheat produced and ten million bushels of spring wheat. But in Wisconsin they raised twenty-four million bushels of spring wheat to one million of winter; in Iowa the preponderance of spring wheat was just as great; in Minne-

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[1] *The Cultivator*, VIII, 356 (1851).

[2] *Northwestern Miller*, July 25, 1879, p. 57. See also *United States Patent Office Reports*, 1850, part II, *Agriculture*, 8–12.

[3] See below, p. 105.

[4] Grain and flour in store at Chicago:

	1857	1858
Flour (barrels)	2,650	5,065
Wheat, Spring (bushels)	304,417	589,761
Wheat, Red (bushels)	18,385	263,807
Wheat, White (bushels)	1,845	61,401

(*Hunt's Merchants' Magazine*, XL, 228 (1859).)

[5] *The Cultivator*, VIII, 257–59 (1851).

sota and the Dakotas — where wheat-raising was just beginning — there was practically no winter wheat whatever. Even in Nebraska and Kansas the spring wheat crop exceeded that of the winter variety at that time. Spring wheat growing had advanced much more rapidly than winter wheat so that by 1870 it constituted almost forty per cent of the total crop.[1]

The agricultural experts of the time looked on this development with disfavor, since they regarded spring wheat as inferior. The writer of the 1860 Census report on agriculture expressed this feeling in saying: 'In many sections of the West, spring wheat is now much more extensively grown than winter wheat, and the quality is, of course, inferior to the best samples of the latter. Much can be done, and is doing, to improve the quality of our spring wheat, but the same efforts would give us a winter wheat of much greater excellence. With a better system of cultivation at the West, winter wheat will take the place of the spring variety.'[2] In fact, as we have seen, the farmers of Minnesota and the adjoining States did try to raise winter wheat, but found it impossible to do so regularly, because the crop was repeatedly winter-killed. Climatic conditions thus forced the Northwestern farmers to raise spring wheat only. The changes in milling methods and processes, which this brought about, will be presently considered.

II. Beginnings of Milling in the Middle West

In the Middle West, the first power-mills were, of course, those established by the French settlers or by the Jesuit priests in the Illinois country, at Vincennes, and at Detroit. To these mills Indians as well as white men brought corn and wheat, and considerable amounts of flour were shipped from them to the settlements at the mouth of the Mississippi. The earliest English settlers in Kentucky and Ohio

[1] *United States Census* (1870), III, xxix, 83; *Monthly Summary of Commerce and Finance*, VII, no. 7, p. 1993.

[2] *United States Census* (1860), *Agriculture*, xiv.

were at first dependent on crude wooden 'mortars' or small hand-mills, but power-mills were early developed.[1] Of these pioneer mills, only scattering notices by travelers can be found. We know that the early settlers in the Pittsburgh district had horse-mills to grind their corn, as creeks were scarce in that area. 'But the flour that comes from them is consumed in the country, not being susceptible of entering into trade,' says a pioneer traveler. And the same writer comments on the absence of windmills.[2]

Woods (1820–21) found gristmills operated by water-power in the Ohio region, but these were usually located on small streams and were often forced to remain idle in time of drouth. At such times the floating mills on the larger streams had more business than they could handle.[3] Ordinarily these floating mills moved up and down the stream, tying up wherever they found business. Thus they were able to cover a large area.[4] An early settler in the Ohio region speaks of them in his reminiscences:[5] 'I well recollect that in 1790, so scarce and dear was flour, that the little that could be afforded in families was laid by to be used only in sickness, or for the entertainment of friends, and although corn was then abundant, there was but one mill (Wickersham's), a floating mill on the Little Miami, . . . ; it was built in a small flat-boat tied to the bank, its wheel turning slowly with the natural current running between the flat and a small pirogue anchored in the stream, and on which one end of its shaft rested and, having only one pair of small stones, it was at best barely sufficient to supply the needs of Columbia, and the neighboring families, and sometimes, from low water and other unfavorable circumstances, it was of little use, so that we were obliged to supply the deficiency from hand-mills, a most laborious method of grinding.'

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[1] Lippincott, *Manufactures in the Ohio Valley*, 26–28, 84–88.

[2] Thwaites, *Early Western Travels*, III, 169 (F. A. Michaux 'Travels.' 1802).

[3] *Ibid.*, X, 250 (J. Woods, 'Two Years' Residence . . . on the English Prairie.' 1820–21).

[4] See *Northwestern Miller*, December 3, 1919, p. 1098, for a description of such a mill.

[5] Howe, *Historical Collections of Ohio*, I, 810. Reminiscences of Oliver Spencer.

Many of the water-mills built in the period before 1825 survive to this day. One, built near Mitchell, Indiana, in 1818, will illustrate their characteristics.[1] It had two sets of millstones, the wheat stones being imported from France, the corn stones brought from North Carolina. The machinery even to the gearing and shafting was made of wood throughout. Power was obtained from an overshot wheel of wood, twenty-two feet in diameter. The water was brought to the mill in a wooden aqueduct resting on stone piers. There was a sawmill in connection. Still another mill of the same type in Monroe County, Indiana, operated carding machinery in connection with the flour manufacture, and other types of textile machinery were also found in other early mills. On the other hand, the millstones were almost the only flour-milling machinery to be found in these mills. At times a cheap sifting apparatus was extemporized from book muslins, but very often the sifting was done at home.

In the Ohio Valley, water-power was much less common than on the Atlantic Coast. After 1800, moreover, steam engines were becoming cheaper and more efficient. As a result, many of the larger mills first built in this region were steam-mills. Woods (1821) mentions the famous steam-mill at Cincinnati.[2] Ogden (1821–22) mentions one at Louisville.[3] And Faux (1818–19) speaks of one at Vincennes: 'a large grinding establishment of extortion, giving only thirty pounds of flour for one bushel of wheat, weighing sixty pounds.'[4]

If we are to believe some of these early travelers, practically all the wheat grown in the West, at that time, was sold for shipment to the Eastern States or for export, the settlers themselves eating corn.[1] The export market for most of their wheat and flour was New Orleans. In the Ohio Valley itself, Louisville seems to have early developed importance as a flour market,[2] but was soon outdistanced by Cincinnati.

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[1] *Northwestern Miller*, December 23, 1925, p. 1209.

[2] Thwaites, *Early Western Travels*, x, 250, 'Two Years' Residence ... on the English Prairie' (1820–21).

[3] *Ibid.*, xix, 40–41, Ogden, 'Letters from the West' (1821–22).

[4] *Ibid.*, xi, 208, Faux, 'Memorable Days in America' (1818–19).

A. Cincinnati as a Flour Market

There was a system of flour inspection at Cincinnati as early as 1802,[3] but the first mill was probably the large steam-mill already referred to, which was built in 1812–14. This was a notable building for the pioneer days, since it was nine stories high and built of stone. Only part of the building was used for flour-milling in fact, but in this was installed a complete set of machinery 'on the plan of Oliver Evans' and driven by a seventy horse-power engine.[4] Milling increased in the next two decades as the tributary Miami Valley developed into a specialized wheat-growing district. In 1829 some 85,000 barrels of flour were produced in the city and as late as 1860 there were six mills there.[5] In the main, however, the mills were built in the surrounding area and Cincinnati developed, not as a milling center but as the market where the flour was sold. With the development of the river steamboat traffic, the area of this market was gradually extended,[6] until, in 1841, Cincinnati claimed that the commerce of the city was 'co-extensive with the navigation of the West.'[7] By that decade the city's receipts and shipments compared favorably with those of the leading Eastern centers.[1]

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[1] Thwaites, *Early Western Travels*, III, 191, André Michaux, 'Travels into Kentucky' (1793–96).

[2] *Ibid.*, XIX, 40–41, Ogden, 'Letters from the West' (1821–23). Louisville also developed a considerable flour manufacture since it had water-power available. *Hunt's Merchants' Magazine*, XXXIII, 128 (1855).

[3] Cist, *Cincinnati in 1841*, 193.

[4] Ford and Ford, *History of Cincinnati*, 324; Drake, *Pictures of Cincinnati in 1815*, 147.

[5] Cist, *Sketches and Statistics of Cincinnati* (1851), 277–78. Bidwell and Falconer, *History of Agriculture in the Northern United States*, 308–09.

[6] Goodwin, *The Growth of Ohio*, 80–88.

[7] Cist, *Cincinnati in 1841*, 9. See also Howe, *Historical Collections of*

But while the flour trade of the city increased greatly between 1840 and 1860, flour manufacture seems actually to have declined. Doubtless the absence of water-power weakened Cincinnati in her efforts to build up the manufacture of flour on a large scale. The growth of a considerable milling industry at Dayton in this period may have had a similar effect.[2] The trade with the South was taken away by other centers more favorably situated, particularly St. Louis, so that after 1852 the bulk of the flour shipments of Cincinnati went east by rail rather than south by water, and this was even more true after the interruption caused by the Civil War.[3] Most important was the fact that after the completion of the Ohio Canal in 1832 the grain of the region around Cincinnati was diverted northward to the Lake Erie route.[4] Considerable milling centers were developed at Cleveland, Akron, Toledo, and Fostoria, and these mills as well as the lake route drew the wheat supplies away from Cincinnati. As early as 1842 it was claimed that the price of wheat in Ohio varied in proportion to distance from Lake Erie, being highest in regions nearest the great consuming centers —

Ohio, 220–21 (1847), for the trade area claimed to be tributary to Cincinnati at that date.

[1] Cincinnati Flour Trade:

	Receipts	Shipments (bbls.)		Receipts	Shipments (bbls.)
1847–48	151,518	201,011	1854–55	342,272	199,276
1848–49	447,844	267,420	1855–56	546,727	509,061
1849–50	231,859	298,908	1856–57	485,089	416,789
1850–51	482,772	390,931	1857–58	633,318	609,210
1851–52	511,042	408,211	1858–59	558,173	562,139
1852–53	447,089	312,841	1859–60	517,229	478,308
1853–54	429,464	332,778			

(Cincinnati Chamber of Commerce, *Annual Report* (1884), 170.)

[2] *Hunt's Merchants' Magazine*, XXVI, 573–75, gives statistics for Dayton for 1849–51.

[3] Bidwell and Falconer, *History of Agriculture in the Northern United States*, 308–09.

[4] Schmidt, 'The Internal Grain Trade of the United States,' in Schmidt and Ross, *Economic History of American Agriculture*, 197–209.

Montreal, Albany, and New York City.[1] Ten years later three fourths of the flour and grain of Ohio was being exported through the lake ports.[2] Cincinnati's receipts and shipments of flour continued to increase — albeit gradually. In spite of many fluctuations,[3] the dominance of the Lake Erie ports was by 1850 definitely established.[4] Cleveland, rather than Cincinnati, became the metropolitan center of the Ohio region. The permanent milling centers of the West were to rise in areas where the wheat supplies were not so easily drawn off to the Eastern mills.

B. St. Louis as a Milling Center

There were mills for grinding flour in St. Louis as early as the days of the Spanish occupation. Two of the earliest were financed or operated by the Chouteaus, the fur-traders.[5] In the first decades of American occupation, the production of wheat did not keep pace with the increase of population and wheat and flour had to be brought in from the Ohio Valley.[6] In 1841 there were but two mills in the city, producing only 13,656 barrels of flour.[7] After that date the wheat surplus in the tributary territory began to grow enormously and the manufacture of flour, both in the city and the surrounding territory, expanded with equal rapidity. By 1851 there were nineteen mills in the city manufacturing nearly half a million

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[1] *The American Farmer*, IV, n.s. 62 (1842).

[2] Andrews, *Trade and Commerce of the British North American Colonies*, 708. See also *Hunt's Merchants' Magazine*, XXV, 438–39 (1851).

[3] Cincinnati Chamber of Commerce, *Annual Report* (1900), 186.

[4] Ohio flour ports — shipments in 1852:

Cincinnati....	408,211 (bbls.)	Cleveland.....	760,000 (bbls.)
Sandusky.....	310,483	Portsmouth...	44,620
Toledo.......	415,817	Scattering	.....
		Total...	2,055,607

(*Hunt's Merchants' Magazine*, XXIX, 511–12.)

[5] For a detailed account of the early mills of St. Louis down to the Civil War period, see *The Roller Mill*, August, 1899, pp. 91–92.

[6] Lippincott, *Manufactures in the Ohio Valley*, 162–63.

[7] *Hunt's Merchants' Magazine*, XV, 164.

barrels.[1] Five years later the St. Louis production, together with the receipts from tributary territory, were over a million barrels.[2] Before the Civil War began, St. Louis ranked with Rochester as our leading flour-manufacturing center. From 1865 to 1885 it shared with New York the leadership as a flour-marketing center. That period of its history, however, will be discussed in a later chapter.

The surplus above local needs seems, at first, to have gone to the Atlantic markets. The natural route of such shipments was down the river to New Orleans. However, some shipments seem also to have gone up the Ohio River to Cincinnati and thence by the canal and lake route to New York City.[3] The freight charges by the southern route were somewhat lower, but the flour was said to arrive in better condition by the northern route.[4] Gradually New Orleans became something more than a trans-shipping point, and her merchants distributed St. Louis flour throughout the Gulf States from Florida to Texas. Meanwhile, St. Louis had been building up a distribution system of her own by taking advantage of the river navigation. Supplies of flour were sent up the Cumberland, the Tennessee, the White and Red Rivers, the lower Mississippi, and the Ohio.[5] The flour of St. Louis was manufactured especially for this market. The growth of the city as a railroad center increased its leadership in this region at the same time that it drew to St. Louis the wheat of a wider and wider area. The railroads provided supplies of wheat and made shipments of flour with greater regularity

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[1] *Hunt's Merchants' Magazine*, XXVI, 312–13.

[2] St. Louis, receipts and manufactures of flour (in barrels):

Year	Receipts	Mfres.	Year	Receipts	Mfres.
1851.....	184,715	409,099	1856.....	323,446	678,496
1852.....	132,050	383,184	1857.....	576,644	662,458
1853.....	201,487	455,076	1858.....	687,451	825,651
1854.....	192,945	503,157	1859.....	484,715	663,446
1855.....	226,450	603,353	1860.....	443,196	839,165

(Merchants' Exchange of St. Louis, *Trade and Commerce* (1880), 67.)

[3] *Hunt's Merchants' Magazine*, XV, 355 (1846).

[4] *Ibid.*

[5] Lippincott, *Manufactures in the Ohio Valley*, 162–63.

than the river steamers.[1] The founding of the Merchants' Exchange in 1849 increased the city's importance as a flour and wheat center.[2] After the Civil War the city began to export flour directly to foreign countries. The millers found that their flour bore transportation to the tropics very well and began to compete for the Spanish American market with the Baltimore and Richmond mills.[3] In the eighties flour was shipped to the European markets as well.

No other great milling center had been developed up to this time that did not have the advantage of water-power. St. Louis had none.[4] She did have compensating advantages in her unrivaled water transportation facilities, and later in railroad transportation. Her millers took full advantage of both. We know that in the seventies, for example, they played off water routes against railroads, shipping by whichever gave them the lower rates. And their water routes were open all the year round, as those of Rochester and Minneapolis were not. As between the different railroads the millers of St. Louis are said to have combined to ship all their flour to Eastern markets by the route which offered the lowest rate. In 1877 it was stated that, 'For four years they shipped exclusively by the Ohio and Mississippi and the Baltimore and Ohio. Then they tried the Chicago and Alton and the Wabash for a couple of years. With the expiration of the contract with these two lines, the different roads running out of St. Louis agreed to charge the millers full tariff on all flour shipments whether they shipped a part or all by any one line. This compact was broken, it is said, by the Vandalia line, which transported all the flour manufactured by the association for two years under a liberal schedule of rates. When the two years were up the railroads all agreed once more, not to give the millers a better rate over any one line. This agreement was observed while it was being signed and no longer, for, as the story goes, the Wabash company contracted with the association to carry their flour at thirty cents a hundred to New York, and thirty-five to Boston, which is five cents per hundred under the regular figures.'[1]

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[1] *Hunt's Merchants' Magazine*, XXVIII, 428–29.

[2] Smith, *Wheat Fields and Markets of the World*, 334–40.

[3] *Northwestern Miller*, January 6, 1882, p. 486.

[4] That is, practically none. The first mill on the site of St. Louis was a water-power mill turned by the water of a small creek running into the Mississippi, but all the large mills of the later period were steam-mills. (*The Roller Mill*, August, 1899, pp. 91–92.)

Next to the transportation facilities one should place the advantage of a fine supply of wheat. The soft red winter wheat of the St. Louis area had by 1850 come to be regarded as the best produced in this country, and St. Louis, because of her location in the heart of the area in which this wheat was produced, together with the marketing organization provided by her Exchange, was able to get the best wheats for her mills.

C. Rise of the New Orleans Market

We come, lastly, to New Orleans, the only one of the great flour markets before the Civil War, which never made any pretense of being a manufacturing center. It is said that the Jesuit missionaries tried to set up mills in Louisiana about 1720, but the millstones, being of a soft stone, crumbled in the grinding and their flour was not a success.[2] In any event, the climate of the region about New Orleans was not suited to wheat-growing and in those days it was cheaper to transport the flour than the wheat. The settlements about New Orleans seem to have been supplied largely from the Illinois country from their beginning and this continued under Spanish and American rule, though there were times, before 1815, when supplies of flour were demanded from Atlantic ports.[3] After that date supplies from the Northwest provided a surplus and New Orleans became a point of transshipment for flour destined for the Atlantic ports, the West Indies, and Europe, as well as a distributing center for the Gulf Coast. The growth of New Orleans as a market for Western flour is shown by the statistics given below.[1] It was very slow up to about 1830, but after that date the figures show the influence of the growth of St. Louis as a milling center.

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[1] *Northwestern Miller*, October 5, 1877.

[2] Lippincott, *Manufactures in the Ohio Valley*, 26–28.

[3] Jefferson, *Writings*, XII, 109 (July 29, 1808). He refers to a petition of Tyson and James millers of Baltimore for permission to ship flour to New Orleans during the embargo.

New York and Boston were clearly the important domestic markets, Cuba the principal foreign market, with Great Britain becoming more important in later years.[2] By 1845 New Orleans was one of the four leading flour markets of the country. In its receipts from the interior centers and in exports it ranked with Philadelphia and Baltimore; in both items it was far behind New York City.[3] After 1858 its exports began to decline, the river route losing ground before the competition of canal and railroad routes to the East. The flour of the Ohio Valley was shipped eastward rather than southward. New Orleans' receipts of flour from the

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[1] New Orleans, flour receipts (annual average, in barrels):

1822–24....	111,941	1835–39....	316,492	1853.....	808,672
1825–29....	142,130	1840–44....	488,417	1854.....	874,256
1830–34....	259,027	1845–49....	518,985	1858.....	1,538,742

(Clark, *History of Manufactures*, 623; *Hunt's Merchants' Magazine*, v, 476; xvi, 190; xxxi, 450; vii, 391; xiii, 370; xvii, 414; xi, 419.)

[2] New Orleans, flour shipments, 1842–51, in barrels:

Year	To New York	To Boston	To Philadelphia	To Baltimore	To Charleston	To Other Coastwise Ports	To Cuba	To Other Foreign Ports	Totals
1842	79471	74715	446	394	1150	17856	23867	73596	271,495
1843	101336	81955	3540	67	1494	40717	26747	82916	338,772
1844	48323	63653			1305	48718	29314	108679	300,082
1845	74802	75960	3638		1100	43959	23787	55891	279,137
1846	83854	122148	250		11476	68441	7094	279931	573,194
1847	63877	96507	13296	3638	37720	8381	43051	1053037	1,319,506
1848	80940	210545	26452	50	6235	39635	14038	94625	472,519
1849	174898	303563	14837	10	4086	62025	740	218211	778,370
1850	8625	65694	500	202	2034	107264	366	27065	211,750
1851	72584	88925	418		6175	150960	206	264150	583,418

(*Hunt's Merchants' Magazine*, vii, 391; xi, 419; ix, 570; xiii, 370–72; xix, 325; xxi, 554; xxiii, 558; xxv, 605.)

[3] See above, p. 71, n.1, for a comparison of the flour receipts at the four leading ports.

Northwest continued to increase, however, because the area of domestic distribution demanded increasing quantities.

III. THE FIRST SPRING-WHEAT MILLING CENTERS — MILWAUKEE AND CHICAGO

Since the first considerable area of spring wheat had its beginnings in northern Illinois and southern Wisconsin, the first considerable concentration of spring-wheat milling arose at Milwaukee and Chicago. Flour production seems to have begun at Milwaukee about 1840.[1] As wheat production spread over southern Wisconsin, the city's importance grew, not only as a manufacturing center but also as a wheat and flour market. Milwaukee had a valuable water-power, it was a natural trade center for southern Wisconsin, and it had the lake route to the Eastern markets. Some of the milling firms prominent in later milling history — notably J. B. A. Kern and Sons — got their start in Milwaukee at this period. In 1854 there were five mills producing over 130,000 barrels of flour and in 1860 fourteen mills with an aggregate output of over 200,000 barrels. Production declined momentarily during the Civil War, then recovered with a rush. By 1868 Milwaukee was producing over a million barrels annually. For a time the city disputed milling leadership with St. Louis, then both cities were outdistanced by Minneapolis. This was in

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[1] Milwaukee flour production and trade (annual average in barrels):

YEAR	SHIPMENTS	PRODUCTION	YEAR	PRODUCTION
1845–47......	20,722		1893–97......	1,780,614
1848–52 [x]....	93,318		1898–02......	1,944,302
1853–57......	164,499		1903–07......	1,519,173
1858–62......	484,973	193,480	1908–12......	1,178,146
1863–67......	625,992	292,142	1913–17......	627,437
1868–72......	1,181,384	554,718	1918–22......	548,607
1873–77......	2,225,316	664,858	1923..........	233,600
1878–82......	3,340,336	830,047	1924..........	193,230
1883–87......	4,587,493	1,015,795	1925..........	372,850
1888–92......	3,248,443	1,608,162 [y]		

(x) Year 1850 missing. (y) Year 1891 missing.

(*Hunt's Merchants' Magazine*, XXII, 329; XLI, 316–17; Milwaukee Chamber of Commerce, *Annual Report* (1914), 88; *Millers' Almanack* (1914–15), 159; *ibid.* (1926), 136.)

spite of the fact that by 1870 Milwaukee had become the principal spring-wheat market.

The following reasons have been suggested:[1] (*a*) The mills at the smaller centers in Wisconsin were generally able to get milling-in-transit rates, which, added to local opportunities, gave them an advantage over the Milwaukee millers. Hence the industry grew relatively faster at the interior centers during 1870–80. (*b*) The deterioration in the quality of the Wisconsin wheat caused a decline in the quality of the flour of the smaller mills which used only local wheat supplies, and this, in turn, a prejudice against Wisconsin flours which put the Milwaukee millers to a disadvantage in the Eastern markets. (*c*) The prominence of Milwaukee as a wheat market, while it gave the millers large stocks of wheat to select from, also, it is said, attracted buyers from all over the country, so that the millers had to pay the highest market price.[2] More than that, the fluctuations in wheat prices, caused by speculation, were an obstacle to milling growth, the millers claimed, for this made it difficult to fix a fair price for their flour.[3] (*d*) Then, too, the water-power proved insufficient for the expanded industry and steam-plants had to be put in, which meant increased expense. Growth was fairly steady, however, until 1892, when the city's output exceeded two million barrels.[4]

After 1892 there was a decline in milling which Milwaukee attributed to discriminating freight rates. The city claimed that its advantages were equal to those of Minneapolis. The latter's advantage in water-power was offset by cheaper coal, its nearness to the wheat regions by Milwaukee's better facilities for distribution and its shorter distances to the Eastern markets. 'With the assurance of relatively equal freight charges from the wheat-fields of the West to Milwaukee and Minneapolis, which the Interstate Commerce Commission has power to enforce, the milling business of Milwaukee will continue its prosperous growth, while that of Minneapolis will not be deprived of any advantage to which it is fairly and naturally entitled.'[1]

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[1] Thompson, *Wheat-Growing in Wisconsin*, 108.

[2] *Ibid.*

[3] *The Millers' Journal*, XIII, 286 (March 31, 1880). As to this point see comment below on a similar claim made for Chicago.

[4] Milwaukee Chamber of Commerce, *Annual Report* (1895), 31.

The complaint was not only of the granting of rebates and special rates to Minneapolis, but also of the milling-in-transit privilege granted to that city on wheat from southern Minnesota, whose natural market, it was felt, was Milwaukee.[2] In 1898 the Interstate Commerce Commission held that some of the rates from southeastern Minnesota were unfair to Milwaukee and ordered the railroads to correct them. But it was claimed the railroads did not obey the order. Milwaukee was at a disadvantage in the struggle, in that it was not a railroad center.[3]

The struggle continued for another decade. Improved methods of handling flour were introduced as well as improved transportation facilities across the lake.[4] The Milwaukee millers ground winter wheat when they could not get spring.[5] Some of them utilized part of their milling capacity for making breakfast cereals.[6] The city's flour production was kept above the million-barrel mark until 1912. Since then it has declined so rapidly that there seems a real danger of milling disappearing entirely from Milwaukee's industries.[7] Milwaukee's greatest disadvantage is her location at a distance from the wheat-fields with Minneapolis in a position to intercept her supplies. It seems improbable, therefore, that there will be a renascence of milling in Milwaukee in the near future.

The history of Chicago as a milling center in many ways parallels that of Milwaukee. The first mill was erected in

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[1] Milwaukee Chamber of Commerce, *Annual Report* (1895), 30.

[2] Thompson, *Wheat-Growing in Wisconsin*, 108–10.

[3] Milwaukee Chamber of Commerce, *Annual Report* (1898), 23. *Modern Miller*, September 22, 1900, p. 20.

[4] Thompson, *Wheat-Growing in Wisconsin*, 110.

[5] Milwaukee Chamber of Commerce, *Annual Report* (1906), 81.

[6] *Ibid.*, 87.

[7] See above, p. 88, n.1, for statistics of Milwaukee production.

1836.[1] Ten years later three flour-mills were reported.[2] In 1851 there were four mills with fourteen run of stone. The year before they had manufactured some sixty thousand barrels of flour.[3] Production grew steadily until it reached almost three quarters of a million barrels in 1868, then declined for over a decade so that the million-barrel mark was not reached until 1897. That figure has never been greatly exceeded. Not since 1871 has Chicago produced sufficient flour to supply her own needs.[4]

The case is a puzzling one. Chicago has many advantages for milling. If it has no water-power it does have cheap fuel from near-by coal-fields. No other city has so large and so varied a wheat supply as the Chicago market provides. The advantages of the city as a railroad center and as a great consuming community are obvious. Yet manufactures did not keep pace with receipts and shipments. By 1873 shipments were almost ten times as large as output.[5]

Here, as at Milwaukee, it was claimed that the city's prominence as a wheat market affected the millers adversely.

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[1] Kirkland, *History of Chicago*, 402.

[2] *Hunt's Merchants' Magazine*, XVII, 168 (1848).

[3] *Ibid.*, XXVI, 485 (1851).

[4] Andreas, *History of Chicago*, III, 322.

[5] Chicago flour production and trade (annual average, in barrels):

YEAR	SHIPMENTS	PRODUCTION
1842	2,920	
1843–47	17,252	
1848–52[x]	51,438	
1853–57	164,413	82,110
1858–62	1,019,731	217,347
1863–67	1,619,687	359,951
1868–72	1,818,721	446,888
1873–77	2,402,446	264,600
1878–82	3,397,145	265,757
1883–87	4,843,622	483,075
1888–92	4,660,380	483,440

YEAR	PRODUCTION
1893–97	753,476
1898–02	1,196,037
1903–07	904,776[y]
1908–12	1,026,600
1913–17	1,133,800
1918–22	1,134,300
1923	1,342,000
1924	1,858,000
1925	1,781,000

(*x*) Figures for 1852 missing.

(*y*) Figures for 1906–13 inclusive are merely estimates.

(*Hunt's Merchants' Magazine*, XVIII, 168; XXVI, 428; XXII, 211; XXVI, 485; XVI, 364: Kirkland, *History of Chicago*, 405. *Millers' Almanack* (1914–15), 158: *ibid.* (1923), 207; *ibid.* (1926), 138; Chicago Board of Trade, *Annual Reports*, 1893–1903.)

In 1880, for example, the Board of Trade stated that flour-milling did not invite vigorous prosecution in the city on account of the fact that the price of wheat ranged almost always relatively higher than that of flour.[1] In 1892 the Board stated that 'extensive wheat speculation in Chicago causing higher relative prices here than elsewhere prevail, render this an unfavorable locality for the establishment of flour mills.'[2] The point is of doubtful validity. At a time when their grain exchange was not yet organized, the Minneapolis millers were claiming that they paid a premium over Milwaukee and Chicago prices for the better grades of wheat:[3] It probably points, however, to the essential fact that costs of operation were higher at Chicago than at competing centers. There can be no doubt that Chicago mills suffered from the competition of country mills in their vicinity as well as from the mills of Minneapolis.[4]

In 1901 Chicago was given milling-in-transit privileges, yet there was no considerable growth in output in the years following. Recent investments by Minneapolis millers indicate that they look favorably on Chicago's milling future.[5] The city is favorably located for drawing supplies of red winter and Kansas wheats as well as spring wheat. Twenty years ago her mills were built in separate spring and winter wheat units.[6] The advance of milling technique has made this unnecessary now and has put a premium on the opportunity to blend the several varieties. Merely because of its position as a distributing center, and its large population, Chicago will always have a considerable flour production. On the other hand, the unfortunate labor situation, and the growing difficulties resulting from freight congestion in the railroad yards tend to prejudice millers against Chicago as a field of operation.

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[1] Chicago Board of Trade, *Annual Report* (1880), xiii.

[2] *Ibid.* (1892), xii.

[3] See below, p. 143.

[4] Kirkland, *History of Chicago*, 403–04.

[5] The Washburn-Crosby Company has purchased the Star and Crescent mills and also provided for the erection of a cereal mill there. See below, p. 175.

[6] *The Roller Mill*, April, 1900, p. 554.

In any case, neither Milwaukee nor Chicago are now distinctively spring-wheat centers. The territory immediately tributary has changed its agricultural methods. Wheat-growing has been replaced by dairying and diversified farming. Newer and hardier strains of wheat have made it possible for the farmers in that region to grow winter wheat in place of spring. The mills of the two cities now grind more winter wheat than spring. After 1870 the center of spring-wheat production moved on into Minnesota, the Dakotas, and Montana; and Minneapolis was the natural center for all that area. To that city we must now turn. But to understand the reasons for the rapid growth of milling in that center it is necessary to review changes in milling methods and processes.

IV. Milling Processes and Methods (to 1870)

A. The Colonial Mills

The machines in the typical mill of the colonial period were few and the processes simple. Three things needed to be done: (1) the wheat as it came into the mill had to be cleaned of dirt and chaff, (2) the clean wheat had to be ground, and (3) the product of the grinding had to be bolted through a fine cloth which would allow the flour to pass through but would reject the husks or bran. 'The end we have in view in grinding the grain,' says Oliver Evans, 'is to reduce it to such a degree of fineness, as is found by experience, to fit it to make the best bread, and to put it in such a state, that the flour may be most effectively separated from the bran, or skin of the grain, by means of sifting or bolting.'[1]

The wheat as it came into the mill was run into a slowly revolving cylinder covered with a wire screen, through which a blast of air passed. The air blast got rid of dust and chaff and the friction of the screen was supposed to cleanse the wheat of the particles of dirt adhering to it.

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[1] Evans, *The Young Millwright and Miller's Guide*, 247.

From the cleaner, the wheat passed to the millstones, the principal part of the mill machinery. These consisted of two flat circular stones, varying (at different times and places) from three and a half to seven and a half feet in diameter. The lower stone was fixed, the upper balanced to revolve upon the nether.[1] The surfaces facing each other were grooved or roughened in such a manner as to give both a cutting and a crushing action.[2] Before 1860, 'low' or 'close' grinding was the rule in most American mills. The stones were set close together, the object of the miller being to make as much flour as possible at the first grinding.[3] The composition of the stones, their adjustment to each other, the 'dress' of the stones, and the speed at which they revolved, were all matters of importance. High prices were paid for millstones imported from France. Emphasis was laid upon the careful balancing of the upper millstone upon the nether. After 1860 machines were invented for the dressing of the stones, but in the earlier period, the mills depended upon highly skilled millstone dressers who went over the stone with proof-staff and pick.[4]

The wheat passed from a hopper suspended above the millstones through an opening in the upper stone into the space between the stones, whence, after being ground, it dropped into another hopper beneath, as 'meal' or 'chop.' From the hopper it passed to the cooling rooms to get rid of the heat generated in grinding and then to the bolting apparatus. In the smaller mills this consisted of a single, revolving, cylindrical, or hexagonal, reel, about twenty feet long by thirty inches in diameter, covered with bolting cloth.

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[1] Jefferson (*Writings*, XIX, 34), in a letter to the Abbé d' Arnal, in 1787, described a method of hanging the upper millstones which he said was in general use in the United States and was superior to the European method.

[2] Evans, *The Young Millwright and Miller's Guide*, 256–58; Amos, *Processes of Flour Manufacture*, 134–35.

[3] Milling Systems in 1881, *Northwestern Miller*, February 18, 1881, p. 98.

[4] Gray, 'A Quarter Century of Milling,' *Northwestern Miller*, October 25, 1899; Amos, *Processes of Flour Manufacture*, 135–36.

Usually there were cloths of three different degrees of fineness on the reel. At the head was the finest cloth, at the foot, the coarsest. The reel was slightly tilted toward the lower end so that in revolving the meal was gradually carried through. The flour was sifted through the finest cloth at the head of the reel, from the mid-section came the 'returns'; the product of the coarsest cloth was called 'shorts' and the bran tailed over the lower end. The 'returns' went right back to the upper end of the reel for further separation and the tailings were sent back to the millstones to be reground. In the larger mills there were likely to be several such reels, all enclosed in a wooden chest in order to prevent the flour from being blown about the mill.[1] From the reel the flour was sent to the packing-room where it was packed by hand into barrels or sacks.

Most of the mills were mechanically of the simplest type. The lack of capital prevented an efficient development of the water-power. Only that of the smaller streams could be used — to dam one of the great rivers would require far too large an investment. Very often the dam was dispensed with and wooden flumes which conveyed the water from the crest of the falls to the mills served as poor substitutes. More commonly still the undershot wheel was used. This could be set in the stream almost anywhere, without the use of dam or mill-race, but since it utilized only the force of the current, the power obtained was small. Therefore, it was often necessary to have a separate water-wheel for each piece of machinery. The more efficient overshot wheel, which utilized the power in the fall of the water was used in the larger merchant mills.

In the machinery there was also much variation. Many of the small custom mills had no machinery either for wheat-cleaning or flour-bolting; only the millstones for grinding. The farmer who was dependent on such a mill had to carry home his meal and sift it out by hand. A step in advance of this type was the mill which had a bolting machine. Often these bolters had to be turned by hand, and the farmer bringing his grist to the mill had to do the work himself. But in the better mills the bolters were operated by water-power. Generally woolen bolting cloth was used (in the earliest mills a wire screen), but, at the end of the colonial period, the most advanced mills were adopting the silk cloth used today.

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[1] Amos, *Processes of Flour Manufacture*, 135–36.

The slight use of crop rotations caused an increasing foulness of the wheat of the staple area and this, in turn, an increased use of wheat cleaning machinery of the type described above. The best of these rolling screens seem to have been imported from Germany, just as the bolting cloth came from Holland and the best millstones from France. Where 'French burrs' could not be afforded, use was made of local stones. Some of the mills advertised for sale have 'Dutch cullings' (from Cologne?). Stones quarried at Esopus, New York, seem to have been widely used. It may be that the presence or absence of a good local supply of millstones may have had some influence on the distribution of the mills, though the data available are too limited to venture an assertion on this point.

B. Improvements in Milling Machinery: Oliver Evans

A review of the development of flour-milling between 1790 and 1860, however hasty, would be incomplete without some reference to the milling inventions of Oliver Evans, as it is generally held that they mark an epoch in the technical development of the industry, and also, that they gave a superiority to American milling methods which was the chief cause of a rapid growth in our export trade.

Evans claimed that it was in 1782 that he first conceived the plan of improving flour-milling methods. In that year he and his two brothers took a contract to build a new mill in the Brandywine region. 'I then began to study how I could make the mill exceed all others, and having been successful in inventing several useful improvements, I had hopes of succeeding in this also. I first conceived the great design of applying the power that drives the millstones to perform all the operations which were hitherto effected by manual labour, viz. — from receiving the grain from the wagon or ship until manufactured into superfine flour, ready to be packed into barrels; but being neither millwright nor miller, I had first to ascertain what operations were to be performed by manual labor and conceived it possible to execute the whole by the power of water, and the improvement would be extraordinarily great.' [1] He says that he then informed several persons of these plans, but no one believed it possible.[2] Yet the simple contrivances which he claims to have introduced for the first time are employed to-day in almost the same form in every modern mill and as a result the modern flour-mill is what Evans conceived it should be — almost an automatic machine.[3]

These inventions — the conveyor, which moved the meal from one machine to another, the elevator which moved it from one floor to another, and the 'hopper-boy,' which spread the flour for cooling — have been described in the previous chapter in operation in the Brandywine mills in 1795. Evans says that, meeting with certain difficulties in constructing the machines, he applied for aid to the Brandywine millers. They refused to help him, for they could not believe that a man not bred a miller or millwright could make any improvements that were really worth while.[4] Evans then applied for patents to the State legislatures and acts were passed, giving him exclusive rights in Pennsylvania, Delaware, Maryland, and New Hampshire.[5] He then removed to Philadelphia, where, 'in order to increase his dealings and correspondence with the millers, he kept for sale, bolting cloths, and established a manufacture of burr millstones. . . .'[1] Having made models and drawings, he sent out agents with them, offering the free use of the inventions to the first miller in each county who would put them into his mill. Even this plan worked very slowly, the millers being skeptical; they 'would ask if the Brandywine millers had adopted them, and an answer in the negative was convincing proof that the improvement was not worthy of their notice.'[2] Evans finally persuaded one of the Brandywine millers to put in the inventions and so was able to call in the other millers and give them ocular proof of the efficiency of the new methods. Even then the other millers 'assembled round the hopper-boy, where they remained in silent astonishment, until one of them exclaimed, "It will not do! It cannot do! It is impossible it should do!" — it doing perfectly well all the time.'[3] Evans also got the Ellicotts of Baltimore to put his inventions into their mills. He claims that they agreed that any improvements they made on the machines should be for Evans' benefit, also that they would show the machines to others and report on their workings to him.[4]

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[1] *Oliver Evans to his Counsel*, 5.

[2] *Ibid.*, 7.

[3] Neftel, Flour-Milling Processes, *Census of 1880*, III, 561.

[4] *Oliver Evans to his Counsel*, 9.

[5] *Ibid.*, 10. These patents covered elevator and hopper-boy. About the same time he invented the conveyor, but it was not mentioned in the acts.

When the national patent law was established, Evans applied for and received a grant, January 7, 1791. At that time he seems to have increased the royalty charge, whereupon a great deal of opposition arose. Jonathan Ellicott claimed that Evans had obtained the idea of the conveyor from him, and there were other claimants also.[5] In 1807 the courts declared the patent invalid because the inventions were insufficiently described. Evans then petitioned Congress for relief and a new patent was granted, giving him exclusive privileges for fourteen years, but forbidding the collection of damages for past infringements.[6]

It was claimed that this patent covered (*a*) the process of flour-making by automatic machinery, (*b*) the elevator, (*c*) the conveyor, (*d*) the hopper-boy, (*e*) the drill, and (*f*) the

[1] Scott, *Geographical Dictionary*, article 'Philadelphia.'

[2] *Oliver Evans to his Counsel*, 12.

[3] *Ibid.*, 15.

[4] *Ibid.*, 13.

[5] *Ibid.*, 13.

[6] *Ibid.*, 19.

kiln-drier.[1] Evans did not, of course, claim that the principles of the elevator or conveyor were new, but only that he had been the first to apply them to flour-milling. The leading millers in the Baltimore district, particularly Jonathan and Thomas Ellicott and Elisha Tyson, memorialized Congress against the new patent, claiming that Evans obtained it by deception.[2] They presented affidavits from several Pennsylvanians and Marylanders, claiming that they had put in elevators and conveyors before Evans had patented them.[3] They also presented a letter from Thomas Jefferson in which he argued that the principles of the elevator and the conveyor were well known long before Evans' time and that, therefore, he was not really entitled to a patent.[4] Complaints were made, also, that Evans was charging outrageously high prices for the use of his machines. The committee of Congress, to which the memorial was referred, refused to do anything about it. Indeed, there seems to be no very good reason to-day for denying Evans credit for these inventions.[5]

Once started, the millers seem to have adopted his methods, quite rapidly. Though there was no claim that the product was any better than before, and though Evans' opponents even denied that a larger quantity of flour could be produced from a given quantity of wheat, there could be no doubt as to one great advantage: the great saving in labor. Evans claimed that his improvements had cut the labor bill of an ordinary mill in half. 'Formerly, one hand was required for every ten barrels of flour that the mill made daily; now one for every twenty barrels is sufficient. A mill that made forty barrels a day, required four men and a boy; two men are now sufficient.' [6] Since wages were bound to be higher in America than in Europe, and since there was a dearth of skilled labor as well, the importance of this can hardly be overestimated. There were additional minor advantages in the saving of time in the process of flour-making, since, now, all operations could be going on continuously in the mill, and also a saving of ground space since mills could now be built many stories high. But the saving of labor was the all-important matter.

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[1] *Oliver Evans to his Counsel*, 19–20. Evans' application for the patent and the patent itself are given on pp. 22–25.

[2] *Anti-Evans Memorial*, 3–4.

[3] *Ibid.*, 16–29.

[4] *Ibid.*, 7–15. See also Jefferson, *Writings*, XIII, 326, letter to Isaac McPherson, August 13, 1813, and XIV, 62, letter to Oliver Evans, January 16, 1814.

[5] Evans, *Reply to Jefferson*, 9.

[6] Evans, *The Young Millwright and Miller's Guide*, 239.

However important these improvements may have been from the technical point of view, it is not clear that they exercised any important influence on other phases of the industry. The superiority of American mills was not sufficiently accentuated to enable them to increase their export trade in flour which, from 1815 to 1840, was practically stationary. If we group the exports of flour into five-year periods so as to eliminate the effects of annual fluctuations we get the table given below.[1] Rather, their significance lies in the impetus they gave to the transformation of the industry to a capitalistic basis. They gave the large merchant mill an advantage over the small mill which was to cause the gradual concentration of the industry so characteristic of our own day. The new machinery that Evans introduced was costly. It required a larger amount of capital to acquire and a larger power to operate. The mill-buildings, the mill-dam, the mill-wheels, all required a larger expenditure of capital than before. Other factors, it is true, were working toward the same end. The development of manufactures, the growth of cities, the development of transportation — all

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[1] United States exports of flour in barrels, annual average, five-year periods:

1791–1795	810,443	1826–1830	930,388
1796–1800	596,140	1831–1835	1,048,393
1801–1805	1,031,613	1836–1840	818,586
1806–1810	788,207	1841–1845	1,254,939
1811–1815	1,019,885	1846–1850	2,456,966
1816–1820	1,058,729	1851–1855	3,629,904
1821–1825	800,508	1856–1860	3,155,654

(Pitkin, *Statistical View*, 59–60; American State Papers, *Commerce and Navigation*, vol. 2; *U.S. Commerce and Navigation Reports*.)

these tended to create a wider market. They made possible production on a larger scale, which was only possible to men of large capital.

This, in turn, led to a greater degree of concentration and localization in the industry. The mills of Baltimore and Richmond, as we have seen, assumed a far more dominating position in the industry than the Brandywine millers had ever held. Around the chief milling centers arose many smaller ones. The industry which had been located in the country tended to move to the towns. At the same time there arose in the industry the two conflicting tendencies — on the one hand to locate near the chief sources of the wheat supply, on the other to keep close to the chief markets.

C. Improvements in Milling Machinery and Processes, 1790–1870

There were no revolutionary changes in milling machinery or processes between the inventions of Oliver Evans and the coming in of the 'New Process.' Silk cloth was generally adopted for the sifting of the flour. There was a good deal of experimenting in the matter of the millstone dress, the object being to perfect one that would make the bran as clean as possible (and thus get the largest possible flour yield) without at the same time so pulverizing the bran that it would be difficult to bolt it out of the flour. Improvements were also made in the adjustment of the stones and providing an exhaust to carry off the heat generated in grinding.[1] Then there was a good deal of development in grain-cleaning machinery naturally resulting from the fact that repeated cropping on old lands tended to increase the amount of weed seeds and dirt of various kinds in the wheat. The *separator* was introduced — an arrangement of movable sieves combined with an air blast to give the wheat a preliminary cleaning. Sticks, stones, straws, and other foreign material were sifted out while the air blast carried away the shriveled kernels, smut balls, and other dockage which was lighter than the wheat. At about the same time *smutters*, machines to scour the wheat, were brought in.[1] The separators and the smutters accomplished more efficiently the work formerly done by the rolling screen, i.e., the separator removed foreign material while the smutter cleaned the wheat berry itself of crease-dirt, loose bran, the beard of the wheat, etc.[2]

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[1] Gray, 'A Quarter Century of Milling,' *Northwestern Miller*, October 25, 1889.

V. Summary

The development of wheat-growing in the West necessarily caused the rise of milling in that region — at first to provide local supplies of flour, and then, when production had advanced to the point where there was a surplus for shipment to other markets. The nearest market for these Western wheat-growers, after the invention of the river steamboat, was the cotton belt. It was natural, therefore, that Cincinnati and St. Louis, because of their advantages of transportation, should take the lead as flour centers. Pittsburgh, having no good local wheat area about it, never became important as a flour-milling or marketing center.

Of the three cities, St. Louis had the greatest advantages. Her transportation facilities both by water and by rail were the best. Her supplies of wheat were more ample, for those of Cincinnati were drained off northward by the pull of the New York market. Consequently St. Louis early became the chief milling center in the West. At the same time New Orleans became the chief flour market, holding to St. Louis a position that corresponded roughly to that which New York City held to Rochester.

New lands and new climatic conditions necessarily brought about changes in wheat-growing also. The red winter wheats took leadership away from the white. The northern part of the Middle West developed into a great spring-wheat territory. The white wheat of the Genesee Valley lost prestige before the Mediterranean of the St. Louis area and the Red Fife of the Northwest.

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[1] Dedrick, *Practical Milling*, chap. 3.

[2] Gray, 'A Quarter Century of Milling,' *Northwestern Miller*, October 25, 1889.

New wheats also brought progress in milling methods. The big changes came after 1870, but to understand them clearly it has been necessary to review the milling methods and practices of the period before 1790 and the improvements made between the two dates. The great changes after 1870 are so closely associated with the rise of Minneapolis to milling leadership that we shall discuss them in connection with that topic.

CHAPTER IV

THE GROWTH OF MILLING IN THE SPRING-WHEAT AREA, 1870–90, AND THE RISE OF MINNEAPOLIS AS A MILLING CENTER

I. Growth of Flour-Milling in the Northwest Before 1870

A. The Beginnings of Milling in Minnesota

The history of flour-milling in Minnesota begins with the erection by the soldiers of Fort Snelling of a small gristmill at the Falls of St. Anthony in 1822–23. The falls had been first utilized to provide power for a sawmill which was to cut the lumber for the buildings needed at the fort.[1] Probably at first it was intended to grind only feed for the cattle. But the difficulties of transporting food supplies all the way from St. Louis by boat suggested the attempt to grind flour for the soldiers as well. First results were not encouraging. The mill was not equipped with wheat cleaning or bolting machinery.[2] Possibly, too, the wheat had not been properly dried and stored and so became somewhat mouldy. At any rate, the flour from the first crop made only black, bitter-tasting bread, which, when issued to the soldiers, almost caused a mutiny.[3] Wheat-grinding seems to have continued for several years thereafter, but meantime they were having poor success in wheat-raising. Whether this was due to the number and rapacity of the blackbirds, as one writer suggests,[4] or, as is more probable, to the use of a winter wheat not acclimated to Minnesota, we do not know. Repeated failures strengthened the belief that Minnesota never could grow wheat successfully.[1] The grinding of flour was discontinued and in 1849 both sawmill and gristmill were leased to Robert Smith, a former Congressman, from Alton, Illinois. Smith rented the gristmill to Calvin A. Tuttle, who operated it for some years.[2] In 1853 Smith induced the War Department to sell the mills to him, and thus obtained a claim to the valuable water-power there. The mill seems to have continued to grind feed until 1858, when the Minneapolis Mill Company, having completed its power canal, caused its removal to make way for larger mills.[3]

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[1] Minnesota Historical Society, *Collections*, VI, 478–79. The Falls of St. Anthony are located in the heart of Minneapolis. Fort Snelling is just south of the city at the junction of the Mississippi and the Minnesota Rivers.

[2] *Ibid.*, X, part 2, 640.

[3] *Ibid.*, VI, 95.

[4] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 30.

B. The Early Mills in Southern Minnesota

From the building of the 'Old Government Mill' down to 1851 there were but few mills erected in Minnesota. Only the lands between the Mississippi and the St. Croix Rivers were open to settlement, and the natural resources of that region were such as to encourage the settlement of the trapper, the lumberman, and the miner, rather than the farmer. For many years the scattered settlers could not raise enough grain to feed their cattle. As late as 1849, it is said, 'whole cargoes of flour and pork were shipped from Galena, St. Louis, Quincy, Hannibal, and Dubuque' into the region.[4] A mill seems to have been built in Washington County in 1845-46.[5] Stevens, himself a pioneer, thinks this was the first mill in Minnesota east of the Mississippi, but Rogers, another pioneer, speaks of one built in Ramsey County in 1844.[1] Probably these were only feed-mills, as we hear of the settlers in the region sending their wheat as late as 1850 to Prairie-du-Chien to be ground. The *St. Anthony Express* at that time began to urge the building of mills,[2] though there could scarcely have been a great need for them since according to the Census of 1850 only 1401 bushels of wheat were grown in Minnesota that year.

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[1] Bollman, 'The Wheat Plant,' *Report of the Commissioner of Agriculture* (1862), 66, indicates the common belief of experts at that time that wheat would not grow so far north.

[2] *St. Anthony Express*, May 31, 1851. The mill was located on the west bank of the Mississippi. Up to 1851 there were no lands in Minnesota west of the river that were open to settlement. Consequently, the first settlement at what is now Minneapolis was made on the east side of the river. It was called St. Anthony. After 1851 the west bank was thrown open to settlement and the village of Minneapolis was founded. In 1872 Minneapolis and St. Anthony were united.

[3] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 30.

[4] Stevens, *Personal Recollections of Minnesota and Its People*, 47-49.

[5] *Ibid.*, 116.

With the opening of southern Minnesota to settlement as a result of the Treaties of Traverse-des-Sioux and Mendota (1851), there was a rapid increase of population, for this was a rich prairie region well suited to wheat-growing. From Iowa, Wisconsin, and Illinois came wagon trains of settlers. Still greater numbers came by steamer.[3] During these first years there could be no thought of a food surplus. Bond, writing in 1850, predicted that the farmers of Minnesota would have a market for all that they could raise for years to come, in supplying the Indians, the soldiers, the fur-traders, and the lumbermen who, up to this time, had drawn their supplies from the older States.[4]

This home-market demand, the lack of transportation facilities to the East, and the undeveloped state of transportation within the Territory all tended to stimulate mill-building. An additional stimulus was provided by the opening-up of large tracts of land especially suited to wheat-growing in the prairie section of the State. Notable among these early mills was one erected in 1857 at Northfield (Rice County), later to be made famous by the firm of Jesse Ames & Sons; the Gardner mill at Hastings, which was well known as early as 1859; and the Archibald mill at Dundas, built in 1857.[1] By 1860 there were eighty-one mills in the State turning out a product valued at over $1,200,000.[2] Most of them were small custom mills, with few exceptions, grinding only for toll. Because they supplied only a local market they were widely scattered throughout the wheat-growing area. Though the Census classifies the mills as either water-power or steam, we know that other power was used. Rogers speaks of mills driven by horse-power and by oxen and says that as late as 1868 there were windmills at St. Peter and at Mankato, each of which could grind one hundred and sixty bushels of wheat a day.[3] Some of the mills were quite large, however. Archibald's at Dundas, for example, was a three-story structure with four run of stones. Because of its good reputation, and the scarcity of good mills, the farmers are said to have come to it with their ox-teams for eighty miles around.[4]

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[1] Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, x, part 1, 38.

[2] Stevens, *Personal Recollections of Minnesota and Its People*, 116.

[3] Minnesota Historical Society, *Collections*, IX, 590.

[4] Bond, *Minnesota and Its Resources*, 165. See also the *St. Anthony Express*, June 7, 1851, and January 21, 1853. In the latter number there is complaint of the shortage of teams in the pineries on Rum River. This is laid to the high price of provisions. 'There not being farmers enough here to supply what is consumed in the Territory, all the provisions that go into the pineries have to be brought from points on the Mississippi some hundreds of miles below, then landed at St. Paul and trucked to St. Anthony, at which place the logging teams now obtain their supplies.'

Not even the Civil War and the Sioux uprising of 1863 could stop the growth of milling in Minnesota in the following decade. The number of mills indeed rose from 81 to 507. The capital invested, number of wage-earners, cost of materials, and value of product increased more than proportionately.[5] There had also developed a concentration of milling in certain counties of southeastern Minnesota. Hennepin County had fourteen mills, Winona thirteen, Rice and Goodhue eight each, Houston, Le Sueur, and Stearns, six each.[1] Custom work was still the rule in all but a few of the mills, but merchant milling was also being developed and the mills at Dundas, Northfield, Hastings, and Winona were beginning to be known in the Eastern markets. None of the Minneapolis mills or millers, however, had more than a local reputation up to 1870.[2]

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[1] Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, x, part 1, 37-38; 'Early History of New Process Milling,' *Northwestern Miller*, September 7, 1883, p. 222.

[2] *United States Census of 1860, Manufactures*, 284.

[3] Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, x, part 1, 44. See also *Northwestern Miller*, March 10, 1876.

[4] 'Early History of New Process Milling,' *Northwestern Miller*, September 7, 1883, p. 222.

[5] *United States Census of 1870*, III, 536; *Census of 1860, Manufactures*, 284; *Census of 1900*, IX, 355.

C. Beginnings of Milling in Minneapolis

The development of milling in Minneapolis was, up to 1870, simply a part of a larger movement — the growth of milling in the State as a whole. The same forces were at work with substantially similar results. Nor was the growth of the industry in Minneapolis any more rapid than in the State as a whole. The great transportation systems which were to make the city the gateway to the Northwest had not yet been created; the great wheat-fields of the Red River Valley had not yet been opened up. The wheat region of the period before 1870 was not naturally tributary to Minneapolis, so that La Crosse, for example, seemed as likely to become the chief milling center of the Northwest.[3] In the beginning, Minneapolis had only two outstanding advantages as a prospective milling center — its home market, created by the lumber industry, and the water-power of St. Anthony Falls.

It was the water-power that first drew settlers there. A fall of eighty-two feet in the river created a potential power estimated at one hundred and twenty thousand horse-power.[4] When the land east of the Mississippi was thrown open to settlement in 1838, Franklin Steele staked out a claim on the east bank of the Mississippi, opposite the falls.[1] As soon as he was able to acquire title to the lands, he proceeded to lay out the town-site of St. Anthony, sold lots, and prepared to develop the water-power. In 1848, he began construction of a dam across the east channel of the Mississippi[2] and erected a number of sawmills. The power developed was so small,[3] and the growth of the lumber industry was so rapid, that by 1856 it was felt necessary to develop that of the main channel. While Steele was developing the power on the east side of the river, Robert Smith had staked out a claim at the old Government mill on the west side.[4] In 1856 the State Legislature granted charters to two companies, the St. Anthony Falls Water-Power Company, which absorbed the Steele properties and the Minneapolis Mill Company (in which Governor Cadwallader Washburn of Wisconsin was the leading spirit), which acquired the Smith claim. Each of the companies was to own the water-power to the center of the main channel. The two companies began building their dam across the main channel in 1856. It was a far larger task than that of Steele's original dam and involved a far greater amount of capital, but the work was successfully completed in 1858.[5]

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[1] *United States Census of 1870*, III, 683–84.

[2] 'Early History of New Process Milling,' *Northwestern Miller*, August 24, 1883, p. 174.

[3] 'Advantages of La Crosse as a Milling Center,' *Northwestern Miller*, May 11, 1877.

[4] Minneapolis Board of Trade, *Annual Report* (1876), 13. But this was an overestimate; at present it is reckoned that only about fifty thousand horse-power is available and only thirty-five thousand is actually developed. (Minneapolis Civic and Commerce Association, *Rail-Lake-Rail Rates* (1913), 13.)

It was not merely the lumbermen who wanted and needed this new power. By this time there were three flour mills on the east side of the river. First of these was the Rogers mill, a small gristmill built by Richard Rogers in 1851. By that time there were four sawmills in St. Anthony and the town was becoming something of a lumbering center. To supply feed to meet the local demand, Rogers installed a small portable mill. The following year he seems to have put in additional machinery to make flour also.[1] At that time, as has been shown, there was very little wheat raised in the region, yet, so great was the local demand for flour that in 1854 another mill was built — the Island mill.

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[1] The claim was made jointly by Franklin Steele and Norman Kittson. In 1840 Kittson sold his share to Steele. (*St. Anthony Express*, March 27, 1852.)

[2] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 30.

[3] Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879, p. 121.

[4] *St. Anthony Express*, January 3, 1852. See also Barnes, *op. cit.*

[5] Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 28, 1879, p. 139. See also *The Falls Evening News*, October 15, 1857.

This Island mill was a more ambitious project than that of Rogers. Its owners planned a merchant mill from the start. So they built a three-story building and installed three pairs of millstones with rather elaborate machinery. The mill was located on an island below the falls — hence its name — and the water conveyed to it in a wooden flume. Difficulties of construction were very great; millwrights were hard to obtain; most of the machinery had to be hauled by wagon from Milwaukee to the Mississippi and from St. Paul to Minneapolis.[2] For some years, at least, much of the wheat ground at the mill was brought up the Mississippi by steamer from Iowa and Illinois.[3] In May, 1855, for example, Rollins, one of the owners of the mill who was also captain of a river steamer, brought up two thousand bushels of wheat from those States.[4] Notwithstanding these difficulties, the mill prospered. The growing community had to be fed. Freight charges on wheat were high, but even so there was a handsome profit when flour sold at ten to twelve dollars a barrel. There was practically no competition and a steadily enlarging demand as immigration increased. It is claimed that the mill cost $16,000 and yielded a profit of $24,000 the first year.[1] The figures are somewhat doubtful, but there is no question that for some years large profits were made — on the flour, at least. With the offals it was a different matter. The farmers did not appreciate their value as feed and the supply outran the demand even at very low prices. Often the bins would be so loaded with bran that it would have to be spouted into the river.[2]

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[1] *St. Anthony Express*, October 8, 1852. 'A new Grist-Mill has just been erected by Mr. Rogers adjoining the Saw-Mills next to Main St. It is to be put in operation at once, Mr. R. having gone below for the machinery. This will be a great advantage to our village and the adjoining country, as there has been a large quantity of grain raised this season in this vicinity. Let it be understood that we can make good flour, and production will be so stimulated, that we shall have no need to import any more flour.'

[2] *Northwestern Miller*, August 29, 1879, p. 139. See also *Falls Evening News*, February 11, 1858.

[3] *Northwestern Miller*, August 29, 1879, p. 139.

[4] Stevens, *Personal Recollections of Minnesota and Its People*, 270.

The Island mill is said to have been the first of the Minneapolis mills to ship flour outside of the State.[3] The mill seems to have prospered even in the panic year of 1857. In 1865 it was rebuilt and enlarged so that its capacity was increased to five hundred barrels a day.[4] The Island mill was one of the first to install purifiers, and its middlings flour met with immediate success in the New York market. Then came a series of disasters. In April, 1870, floods destroyed the mill warehouse and partly washed out the foundations of the mill itself, which caused the mill to be shut down for a time. The firm of Cahill, Brown & Martin, which owned the mill, remodeled and was just about to open it when it was destroyed by fire in March, 1872.[5]

Two other merchant mills were built on the east side of the river before 1870, the River or Farmer's mill, built in 1856 and destroyed by the same fire as the Island mill, and the Summit mill, built in 1865 and destroyed by the floods of 1870.[6] Besides these, there were two small gristmills destroyed by the fire of 1872.[7]

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[1] Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, x, part 1, 38.

[2] Letter from Mr. E. R. Barber, Barber Milling Company, Minneapolis (MS.); Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879, p. 121.

[3] Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879, p. 121. The date of the first shipment is somewhat doubtful. C. A. Pillsbury placed the first shipment in 1859 (Depew: *One Hundred Years of American Commerce*, I, 269); James J. Hill set the date at 1862 ('History of Agriculture in Minnesota,' Minnesota Historical Society, *Collections*, VIII, 277).

[4] *Minneapolis Tribune*, June 16, 1870.

[5] *Ibid.*, March 6, 1872.

[6] *Ibid.*, September 26, 1869; April 15, 1870.

[7] *Northwestern Miller*, March 11, 1881, p. 147.

Thus six mills had been erected on the island and on the east side of the river before 1870. For a time they seem to have been a success, but the site chosen was not such as would allow a power development of the modern type. Hence, when the mills were destroyed they were not replaced. Mill-building on the east side of the river waited for the completion of a power canal, which did not come until 1880.

Meanwhile the mills on the west side of the river, after a somewhat later start, had taken the lead. The Minneapolis Mill Company had followed the example of the St. Anthony Water-Power Company in building a number of sawmills on the dam just above the falls. But building space was too limited there. Soon after the completion of the dams, the company dug a power canal around the falls and thus provided room for additional mills. By 1870 nine flour-mills had been erected there. Of these we may note especially the Cataract, built in 1859 and still standing — the oldest of the present Minneapolis mills; the Minneapolis, in which Charles Pillsbury began his milling career, now the D mill of the Washburn-Crosby Company, and the Washburn B mill, built in 1866 and always referred to in the old days as 'the big mill,' in which the 'New Process' and the purifier were brought to commercial success.[1] By 1870 there were thirteen mills at the Falls of St. Anthony. In 1860 four mills had produced 30,000 barrels of flour; in 1865 seven mills produced 98,000 barrels, and in 1869 thirteen mills produced over 250,000 barrels. The home market was, by that time, outgrown and seventy per cent of the flour was being shipped to outside markets. The thirteen mills represented an investment of almost half a million dollars and the value of the product for several years had averaged over $1,500,000.[1] Yet the period of greatest growth was still to come. It awaited the development of new methods in milling to which we must now turn.

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[1] Mills built on the west side of the river before 1870:

(1) City mill. Built in 1857. In 1879 replaced by the Northwestern — the D mill of the Northwestern Consolidated.

(2) Cataract — 1859.

(3) Union — 1863 — acquired by Northwestern Consolidated — torn down in 1916.

(4) Arctic — 1866 — later renamed St. Anthony — torn down with Union.

(5) Minneapolis — 1866.

(6) Alaska or Taylor mill — 1866, now the Pillsbury B.

(7) Washburn B — 1866.

(8) Dakota — 1867 — owned by the Mills of Albert Lea Company.

(9) People's Mill — 1870 — a small custom mill, no longer existing.

(Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879, and following numbers; 'Early History of New Process Milling,' *ibid.*, August 24, 1883 ff.; *Annual Reports*, Minneapolis Board of Trade, Minneapolis Chamber of Commerce.)

II. The Revolution in Milling Processes 1870-90

A. Milling Systems before 1870

The Minneapolis mills, like most of the others in the country, were using at this time what is known as the 'low' or 'flat' grinding process.[2] The general plan was to bring the millstones very close together, run them very fast, and keep them furrowed with sharp edges so that as much flour could be made at the first grinding as possible. This system of milling was weak in that it did not take proper account of the physical composition of the wheat. The wheat berry is composed of four parts: the outer husk or bran, forming about five per cent of the berry; next to this a layer of aleurone or gluten cells, forming three or four per cent of the total weight; inside this, the starchy interior, or endosperm, which makes up about eighty per cent of the kernel; and, at the base of the kernel, the embryo or oily germ, forming ten or eleven per cent of the berry.[3] In low grinding, the millstones crushed all these elements into an indiscriminate mass. The flour, when permeated with the oil from the germ was likely to become rancid and so would deteriorate quickly. Portions of the bran were pulverized so that they could not be separated from the flour, which was in consequence, discolored and 'specky.' The bran absorbed moisture and hence also caused the flour to deteriorate. On the other hand, the glutinous mass of cells next to the husk were, on account of their hardness, only partly disintegrated and were likely to be bolted out with the bran. These 'middlings' were sometimes reground into flour but the results were not satisfactory in that this flour was likely to contain many particles of bran. The flour from which the middlings were thus bolted out was likely to be 'lifeless' and 'pasty,' since the gluten cells gave the flour its strength.[1]

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[1] 'Fourth Annual Report of the Manufacturing Industry at the Falls of St. Anthony,' *Minneapolis Tribune*, April 17, 1870.

[2] Dedrick, *Practical Milling*, 28.

[3] Dondlinger, *The Book of Wheat*, 14-15. Figures for the relative proportions of these elements vary with different authorities.

As far back as the colonial period, winter wheat had usually commanded a better price than spring because of its superior milling quality.[2] All the difficulties just mentioned were magnified in the case of the spring wheat. Its kernel was rich in gluten, but very hard. To grind it satisfactorily it was necessary to run the millstones with a great pressure and at high speed. The heat thus generated tended to discolor the flour, and also injured its keeping qualities. Moreover, the husk of the spring-wheat kernel was thin and brittle; hence it tended to crumble into fine particles which it was difficult to sift from the flour. Winter wheat, on the contrary, had a thick, tough bran which, in milling, was more likely to separate from the kernel in large flakes which could be easily sifted out. Winter wheat was softer and so ground more easily. There was not the same pressure and speed of stones with resulting heating and discoloration. Winter-wheat flour was therefore whiter, stronger, and less likely to spoil; hence it was everywhere preferred and this preference was extended to the winter wheat.[3]

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[1] 'Milling Systems in 1881,' *Northwestern Miller*, February 18, 1881, p. 98; See also Merk, *Economic History of Wisconsin*, 139 ff.

[2] See, for example, the price statistics in the appendix of Weeden's *Economic and Social History of New England*.

[3] *Northwestern Miller*, February 18, 1881, p. 98; *ibid.*, October 7, 1881, p. 261; *ibid.*, February 16, 1877.

B. The Middlings Purifier and the 'New Process'

Nevertheless, spring-wheat flour was coming to the front, because of the marked shift of wheat-growing to a section of the country where none but spring wheat could be grown. The millers of that section gradually learned to handle the wheat successfully. In doing so they developed the 'New Process.'

The problem, as has been said, was to dispose of the middlings. Because of the hardness of the spring wheat, the glutinous outer portions were not thoroughly pulverized and so were bolted out of the flour as middlings. Low grinding crushed them, but the heat thus generated discolored the flour, and this evil was heightened by the fact that the bran was not thoroughly separated from the flour. High grinding made a great deal of middlings which the miller did not know what to do with. Usually he ground them separately and disposed of the product as a low-grade flour. Yet he knew that this product had many good points. It was rich in gluten, and would make a good bread flour if only it could be purified from the bran and other foreign material which it contained.[1]

The pioneers in the development of the 'New Process' seem to have been certain country millers of southern Minnesota. About 1865 Ames of Northfield was experimenting with a purifier.[2] Before 1870 various others — Mowbray of Winona, Gardner of Hastings, and Archibald of Dundas — were acquiring a reputation in the Eastern markets for their ability to manufacture a fine white flour from spring wheat, a flour that equaled the best winter-wheat flours in appearance and was stronger so that a given amount of it would make more bread.[3] A letter from J. S. Archibald published in 1872 suggests that perhaps the principal cause of this was the superiority of the wheat grown in their immediate neighborhood. He says that the farmers there grew only Scotch Fife, importing seed from Canada periodically.[1] However, their milling methods were different in the following respects. (1) They ran their millstones much more slowly than most of the mills. Thus they prevented the heating and consequent discoloration of the flour. (2) They dressed their millstones more smoothly so as not to cut up the bran more than was absolutely necessary. Instead of grinding the wheat, they tried to crack it and roll it into coarse granular particles. (3) The first grinding was to give about an equal proportion of flour and middlings. (4) The middlings were purified and reground and from them the choicest flour was obtained.[2] These methods the leading Minneapolis millers attempted to install in their own mills.

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[1] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, October 25, 1899.

[2] 'Early History of New Process Milling,' *Northwestern Miller*, October 5, 1883.

[3] 'Historical Sketches,' *Northwestern Miller*, February 16, 1877; *ibid.*, September 7, 1883, p. 222; *Milling*, I, 279 ff.

About this time (1870) there was a change in the largest Minneapolis mill, the Washburn B. There had come to the city as a representative of an Eastern flour commission house a young man named George Christian. In his trips to the mills throughout the State, he had learned something about the problems of the spring-wheat millers and how their leaders were meeting them. A shrewd, far-sighted man, he realized the financial possibilities, should they succeed in perfecting a device for purifying the middlings and making a fine white flour from them. The firm which had been operating the Washburn B mill had failed. Governor Washburn, not being a miller himself, was looking for an experienced man to manage it. Christian went to him and persuaded him to form a partnership of which the former was to be the manager.[3] As head miller he secured George T. Smith from the 'Vermillion' (Gardner's) mill at Hastings.[1] The Washburn B was then thoroughly overhauled and started up in March, 1871.

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[1] *Minneapolis Tribune*, April 16, 1872.

[2] 'Historical Sketches,' *Northwestern Miller*, February 16, 1877. See also *ibid.*, October 17, 1879, p. 249. For a detailed account of the technical side of gradual reduction, see *Northwestern Miller*, February 11, 1881, and following numbers, 'Some Hints on Gradual Reduction.'

[3] *Northwestern Miller*, August 10, 1883, p. 136A; *ibid.*, 'Historical Sketches,' February 23, 1877.

The essential need for the 'New Process' was, as has been said, a machine to purify the middlings. To build such a machine, Christian induced Edmond La Croix to come to Minneapolis. La Croix and his brother had been brought to Faribault, Minnesota, by Alexander Faribault, to operate his mill. In 1868 they had built a purifier in this mill after the design of a machine patented in France in 1860. For two years they experimented with this machine, and then a flood destroyed the mill. Edmond La Croix then came to Minneapolis. Christian had heard of the machine, talked with La Croix, and finally hired him to build a purifier.[2]

La Croix worked on his machine during the year 1870. Christian tried to keep the matter secret and so La Croix was locked in a room at the mill much of the time. In March, 1871, the machine was completed and put into operation. It was a small, crudely built arrangement of moving sieves, which received the middlings and exposed them to an air blast. The lighter particles of bran were blown out, leaving only the clean, white middlings, which could then be reground into flour.[3]

The idea of purifying the middlings was not original with La Croix, since as we have seen, he made use of earlier French models, in designing his machine. It is doubtful, also, if his was the first purifier in America, for there may have been purifiers in operation in the United States before his.[4]

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[1] For Smith's connection with the invention of the purifier, see *Milling*, I, 688-91; II, 211-18, for Smith's own version, as well as the references on this and the following pages.

[2] Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, X, part. I, 48.

[3] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, January 3, 1900; Rogers, 'History of Flour Manufacture in Minnesota,' Minnesota Historical Society, *Collections*, X, part I, 46.

[4] Brown, *New Process Milling*, 58.

The method was new, however, for none of the European machines combined the moving sieve and the air blast as La Croix was doing, the French machines using only the moving sieves.[1] Yet the first machine was not quite satisfactory. The chief difficulty was that the sieves were constantly getting clogged and had to be brushed by hand to keep them open. Smith solved this difficulty by an arrangement of traveling brushes which did the cleaning automatically as they traveled from one side of the machine to the other, sweeping the under side of the cloth.[2]

Various improvements were made on the machine after that. The second machine, for example, contained sieves of varying degrees of fineness so that the middlings could be graded according to size. Even then Christian was not satisfied, but imported several French machines for experimental purposes.[3] Yet it seems that the traveling brushes were the finishing touch that made the purifier a commercial success, and La Croix and Smith should be credited with a great invention.[4]

The purifier made the 'New Process' a commercial possibility. The 'New Process' flour was an immediate commercial success. Christian advertised it as made by a patented process, hence the name 'Patent' came to be used to describe the new type of flour. Christian tried to keep his process secret, but could not do so very long. He seems to have quarreled with Smith, who then became head miller for C. A. Pillsbury and Company and, of course, installed the new machine there.[1] La Croix left the Washburn mill and went to the Cataract, installing purifiers there.[2] There was a rush to the 'New Process' because profits were very large. The Washburn A mill is said to have been built out of two or three years' profits from the Washburn B.[3] Christian himself said: 'Our profits the first year of the "New Process" [1871] were fifty cents a barrel, the second year they averaged a dollar a barrel, the third year two dollars, and the fourth year anywhere from four to four and half dollars a barrel.'[4] And *The Northwestern Miller* asserted in 1877 that in three years the Washburn B mill had made profits of $650,000.[5] Needless to say, this crescendo of profits did not last very long. Within a decade the supply of the new Patent flour had increased to such a point that prices were forced down somewhere near the cost of production. But the unusually large profits did last long enough to cause a great boom in mill-building and to account for the rapidity with which the purifier was adopted.

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[1] Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879.

[2] *Northwestern Miller*, August 10, 1883, p. 136 A; *Milling*, I, 689–90.

[3] Hesler, 'St. Anthony Falls,' *Northwestern Miller*, August 22, 1879.

[4] For the disputed question of the invention of the purifier, and the conflicting patents, see the accounts of the 'Purifier War' in the *Northwestern Miller*, February 20, 1885, p. 115 (good summary); June 1, 1877; June 8, 1877; February 21, 1879; February 28, 1879; March 21, 1879; March 28, 1879; April 11, 1879; April 23, 1879; July 4, 1879; February 6, 1880; March 5, 1880, etc.

The 'New Process' insured the supremacy of spring-wheat flour as the best bread-making flour of the world.[6] The middlings, which formerly had been a disadvantage, now were the chief cause of its superiority. It was now estimated that a barrel of Minneapolis flour would make twelve and one half per cent more bread than the best winter-wheat flours. Relative positions in the market were reversed; spring-wheat flours now commanded the higher price and, in consequence, Minnesota and Dakota wheat began to sell at a premium above other varieties.[1]

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[1] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 33; *ibid.*, 'Historical Sketches,' February 23, 1877.

[2] Fieldhouse, *History of the Flour Milling Industry of Minneapolis*, 11.

[3] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, pp. 33-34.

[4] *Ibid.*

[5] *Northwestern Miller*, February 23, 1877, 'Historical Sketches.'

[6] *Commercial and Financial Chronicle*, December 30, 1882, p. 757. 'Still another circumstance which has operated to promote the growth of our exports of flour, is the superior quality of spring wheat grown from the new lands of the extreme northwest. This wheat makes a flour most desirable from its strength, and the millers of Minneapolis, from the advantage derived from the reputation of their brands, and having unlimited water-power, are able to pay more for it than it will bring in the open market, hence they practically monopolize its use, and those who want flour from it must buy the products of the Minneapolis mills. The high grades of flour made from the choice spring wheat bring a dollar a barrel more than corresponding grades made from winter wheat.'

The 'New Process,' as its name implies, changed milling processes radically. To the three steps in use before, i.e., cleaning, grinding and bolting, it added two more: the purification and regrinding of the middlings. And some of the old steps were greatly changed. The object of the old process was to grind the wheat into as fine particles as possible; of the new process, to granulate it. The old process sought to have as few middlings as possible; the new as many as possible. Accordingly, as has been said, the old system used low, close grinding and rapidly revolving stones, whereas the new system set the stones farther apart and ran them more slowly. Where the old system tried to finish the product at a single grinding, the new ground and reground.[2]

C. Gradual Reduction and the Roller System

Doubtless it was their experience with the purifier that opened up to the Minneapolis millers the possibility of learning new methods from foreign millers. They began to study French and German works on milling and to visit European mills.[3] In Hungary they found a situation somewhat like their own. Hungarian wheat was hard and dry, with a brittle husk. The old system of low milling was unfavorable to it as to the Minnesota wheat. The Hungarians had learned to dampen their wheat before grinding so as to toughen the bran. When they found that their sandstone millstones wore out rapidly and almost ruined their flour with fine grit, they abandoned low milling for high milling and the millstone for the roller.[1]

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[1] *Northwestern Miller*, February 18, 1881, p. 100.

[2] 'Old Style versus New Process Milling,' *Northwestern Miller*, March 8, 1878.

[3] Pillsbury, *American Flour;* in Depew, *One Hundred Years of American Commerce*, I, 266–73.

The roller-mill, then, was established in European flour-milling before it was introduced in this country. E. P. Allis and Company are said to have installed a set of rolls in Mowbray's mill at Winona in 1873.[2] Christian experimented with a set in the Washburn B in the same year.[3] Mowbray's rolls were made of marble, Christian's of cast-iron. Both were unsatisfactory because they wore down very rapidly. About 1876 they began to import porcelain rolls perfected by a man named Wegmann of Zurich,[4] and when this machine was improved by substituting belts for the very noisy spur gears which drove them, and a device to keep the rolls exactly parallel, it became widely popular.[5] The rolls were used at first only for the regrinding of the purified middlings. They did not generate as much heat in grinding as did the millstones, required less power to operate, and did not have to be dressed as often.[6] However, the porcelain rolls were expensive and easily broken and the final stage of development was not reached until rolls made of chilled iron were brought out.[7]

By 1879, *The Northwestern Miller* could say: 'nearly every mill which makes any pretensions to doing nice work is now using rollers more or less. The problem which the progressive millers are working out, is whether rollers cannot be used to the entire exclusion of millstones.' [8] The Wegmann rolls were smooth-faced and for that reason proved unsatisfactory for wheat-grinding. A corrugated roll was necessary for the preliminary granulation. Various manufacturers put out rolls with sharp corrugations, which proved unsatisfactory. In 1879 a new roll with corrugations, which proved to be just what was needed, was put out. This was the invention of a Wisconsin miller, John Stevens of Neenah, who eventually was given a process patent covering the roller method of flour manufacture.[1]

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[1] *Northwestern Miller*, October 7, 1882, p. 261.

[2] *Ibid.*, February 4, 1881, p. 68. See also, *American Miller*, XI, 431; XIII, 189.

[3] *Northwestern Miller*, August 10, 1883, p. 136 A.

[4] For an account of Wegmann, see *Northwestern Miller*, March 14, 1879, p. 161.

[5] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, December 6, 1899.

[6] *Northwestern Miller*, September 12, 1879, p. 170; February 4, 1881, p. 68.

[7] Amos, *Processes of Flour Manufacture*, 136. This is the type used to-day.

[8] *Northwestern Miller*, September 5, 1879, p. 154.

As soon as the corrugated roll was applied to granulating the wheat, its superiority to the millstones became apparent. Consequently, there was a further shift to the all-roller mill. Gray claims to have built the first complete roller-mill in the United States for C. C. Washburn in 1878.[2] By 1881 every mill in Minneapolis was using rollers to some extent.[3] The 'New Process,' with its 'half-high' milling, was but a hesitating step in the right direction. Gradual reduction, carried out logically, meant many more processes and many more machines. The rolls were desirable because, doing at least as good work as the millstones, they required less space, less power to operate, less oversight. A Hungarian miller estimated that the rollers did thirty per cent more work and required forty-seven per cent less power.[4] Where the millstones had to be redressed every three or four days, the rolls would run for months without being changed. Most important of all, the partisans of the rolls claimed that they increased the flour yields from a given amount of wheat.

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[1] *Northwestern Miller*, December 17, 1880, p. 399; January 7, 1881, p. 3; Lawson, 'The Invention of the Roller Flour Mill.' Wisconsin Historical Society, *Proceedings*, 1907, pp. 244–55.

[2] *American Miller*, XI, 431. William de la Barre, a pioneer Minneapolis milling engineer, says the first complete roller-mill was brought over from Switzerland to be exhibited at the Centennial Exposition in 1876 and was then installed in the Sellers mill at Philadelphia.

[3] *Northwestern Miller*, November 4, 1881, p. 323. *The Northwestern Miller* records the rebuilding of the Pillsbury B on a roller basis, December 17, 1880, p. 399; the Holly, January 7, 1881, p. 2; the Pettit, January 28, 1881, p. 51; the Cataract, February 11, 1881, p. 83.

[4] *Ibid.*, February 4, 1881, p. 70.

Some of the Minneapolis millers were so impressed with the Hungarian system of milling that they imported Hungarian machinery, rearranged their mills after the Hungarian pattern, and brought over Hungarian millers to superintend their mills. But the results were not satisfactory. The Hungarian purifiers did not work well on Minnesota wheat and Hungarian head millers could not manage American workmen.[1] Hungarian millers might find it profitable to make eleven different grades of flour, but the American public could not be induced to buy more than three.[2] So the imported machinery, processes, and men did not last long.

When it came to adapting the Hungarian process to American conditions, there was a conflict of opinion as to the number of reductions that should be used. Hence the conflict between the 'long system' and the 'short system' of milling, which was finally compromised by the general adoption of a system based on five or six reductions.[3] The manufacturers of milling machinery helped to solve the difficulty by making machines which would combine steps in the process; for example, putting two sets of rolls in the same roll-frame.[4]

D. Minor Milling Improvements

Along with the substitution of rolls for millstones came a number of minor improvements in milling machinery. We can glance at only a few of these improvements: *The Dust-*

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[1] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, December 27, 1899.

[2] *Ibid.*, December 20, 1899. See also an English view of American milling, *Northwestern Miller*, December 9, 1881, p. 422: 'I had a conversation with the Hon. C. A. Pillsbury of Messrs. Pillsbury & Co., Minneapolis, . . . Mr. Pillsbury says that it suits their market best to make three grades of flour, and from the proportions of flour made, they usually reckon sixty per cent of the first, or patent flour, thirty-five per cent of the second grade, and five per cent of the third. From the ordinary commercial wheat they reckon to make seventy per cent of flour. . . .'

[3] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, January 10, 1900.

[4] *Northwestern Miller*, July 1, 1881, p. 1.

Collector. The purifiers filled the air of the mill with a fine flour-dust. The millers made some effort to collect this dust, for they knew its loss meant a waste of flour, though they did not realize the danger its presence involved. Efforts were made to draw it off by means of suction fans into so-called 'dust-houses,' at the top of the mill. There it was allowed to settle, was collected and worked into low-grade flour.[1] The method was inefficient at best. It required a great disaster to make the millers realize the importance of this matter. On May 2, 1878, there was a great explosion in the Washburn A mill, which was followed by fire and explosions in five other mills.[2] There was a loss of eighteen lives, of three quarters of a million dollars in property, and nearly half the milling capacity of Minneapolis. The resulting investigation showed that an explosion of flour-dust was the real cause. The calamity attracted nation-wide attention, caused the millers to study the problem seriously, and thus resulted in the invention of dust-collecting machinery, by the middle eighties, which was substantially similar to what we have to-day.[3]

Another important improvement was the *Centrifugal Reel.* This was an importation from Europe which was generally adopted in the seventies. It consisted of an outside cylinder covered with silk cloth and running at the speed of an ordinary reel, and inside of it, a fast-running shaft with beaters attached. Whilst the old reels depended on gravity to force the flour through the cloth, this was a force bolter. It was only a third as long and, taking less power to operate, it did far more work than the old machine. Hence the old reel was rapidly superseded.[1] Lastly, should be mentioned the introduction of a wholly new step in flour-making, that of *wheat-tempering*. This process was made necessary by the difficulty of separating the bran from the wheat kernel which, as we have seen, was very great in the case of the spring wheat. Various heating and steaming devices were introduced by means of which just the right degree of temperature and moisture was attained and, as a result, the bran was toughened so that it would come away whole from the kernel.[2]

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[1] Gray, 'A Quarter-Century of Milling,' *Northwestern Miller*, January 10, 1900.

[2] *Northwestern Miller*, May 3, 1878, May 10, 1878, ff. Mills destroyed were the Washburn A, forty-two run of stones; Diamond, six run; Humboldt, eight; Zenith, six; Galaxy, twelve; Pettit-Robinson, fifteen.

[3] Senator Washburn's comment on the explosion in the A mill is interesting. He writes to Major Hale, March 1, 1885: 'I have a letter from my son, Edwin, who states that he has just been down to the Palisade mill and remarks that "it is the dirtiest and most slovenly mill I ever was in." I have remarked the same thing and have, upon two occasions, spoken to Mr. Clarke, the head miller, on the subject, but evidently I do not have much influence with him. If there is anything disgusting, it is a dirty manufacturing establishment, especially a flour-mill; beyond all that, it is very dangerous. If the old A mill had been in a clean condition, there never would have been the explosion.' (Minnesota Historical Society, *Collections*, Hale Papers.)

III. The Growth of the Minneapolis Mills, 1870–90

A. Statistics of Growth

The story of the growth of the Minneapolis mills from 1870 to 1890 is mainly the story of the changes in milling methods during that period which has been described above. The Minneapolis millers, as we have shown, took the lead in introducing the purifier and the 'New Process.' A few years later they inaugurated even greater changes by introducing roller-mills and the 'Hungarian Process.' We may think of the decade 1870–80 as the period of 'New Process' milling and that of 1880–90 as the first decade of roller-milling.

The growth of the Minneapolis mills during the decade of 'New Process' milling can be indicated only very briefly. Of the thirteen mills in operation in 1870, four were destroyed in the next two years, with a loss of fifteen run of stone.[3] But this loss was more than made up by the new mills built in the next few years. The North Star mill, with five run of stones, was erected in 1870, and the Zenith, with six run, in 1871. In each of the next five years two new mills were built, so that by 1876 there were twenty mills with one hundred and ninety-four run of stones, and the annual production had been increased from a quarter of a million barrels to over a million.[1] The disastrous fire and explosion of May, 1878,[2] destroyed six of these mills, but within a year the lost capacity had been regained. By 1880 twenty-four mills had a daily capacity of 15,025 barrels and actually produced that year over two million barrels of flour.[3]

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[1] 'Historical Sketches,' *Northwestern Miller*, February 23, 1877.

[2] *Northwestern Miller*, March 29, 1878.

[3] See above, p. 111.

The growth of the Minneapolis mills after the introduction of the roller process was just as immediate and just as marked as that which followed the invention of the purifier. The *Annual Report* of the Board of Trade for 1880 states that changes in milling had been more radical and universal in that year than in any preceding year. The spread between wheat prices and flour prices was large and profits rose accordingly, often rising, it is said, to three dollars a barrel.[4] Hence, also, there was a rapid growth in the capacity of the mills in 1880 and the years following. By 1890 the capacity of the mills was nearly three times as great as it had been ten years earlier,[1] and the annual output had increased correspondingly.[2] Before that date (by 1882, in fact) Minneapolis had become the leading flour-manufacturing center of the country.[3] That growth had come about largely because of the revolution in milling methods which we have described. The purifier and the rolls were introduced largely to meet the needs of the spring-wheat millers. Of these, the Minneapolis millers were the most far-sighted and enterprising. They took the lead in introducing the new machines and reaped the greatest profits. The new methods of milling had made spring-wheat flour supreme in the chief markets of the world, and again the Minneapolis millers reaped the profit. *The American Miller* quotes Governor Washburn as saying in 1881: 'They can no longer grind wheat in the East to compete with our Minneapolis mills. We grind nothing but hard Minnesota wheat. For this we use Hungarian rollers. Now Eastern millers can not get unmixed Minnesota hard wheat. If they get it it is always mixed with Southern wheat....

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[1] New mills built 1870–90:

North Star, 1870
Zenith, 1871
Holly, 1872
Empire, 1872
Palisade, 1873
Washburn A, 1873
Galaxy, 1874
Anchor, 1874
Hennepin, 1875
Humboldt, 1875
Phœnix, 1876
Pettit-Robinson, 1876
Model, 1878
Excelsior, 1878
Northwestern, 1880
Standard, 1880
Pillsbury A, 1880
Washburn C, 1880
Crown Roller, 1881
Lincoln (Anoka, Minn.), 1883
Columbia, 1883
Florence (Stillwater, Minn.), 1885

Besides these, the *Annual Reports* show several small custom mills, such as the Eagle, the Trades, and the Diamond, which probably made flour only occasionally and so are not regularly included in the report. Minneapolis Board of Trade, Minneapolis Chamber of Commerce, *Annual Reports*.

[2] See above, p. 124.

[3] The Board of Trade *Annual Report* (1880), 54, gives a somewhat larger total, but includes mills under construction in the figures.

[4] *Appleton's Annual Encyclopædia* (1881), 569.

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[1] Estimated daily capacity of the Minneapolis mills (in barrels):

1876...	20 mills,	4840 capacity	1884...	23 mills,	30775 capacity
1877...	21	4925	1885...	25	35075
1878...	19	5625	1886...	25	35075
1879...	19	8250	1887...	25	38000
1880...	26	15025	1888...	25	38350
1881...	24	21725	1889...	24	37850
1882...	25	25250	1890...	24	44100
1883...	23	26975			

(Minneapolis Board of Trade, *Annual Reports*; Minneapolis Chamber of Commerce, *Annual Reports*.)

[2] Annual output of the Minneapolis mills (in barrels), 1860-90:

1860.....	30,000	1877.....	935,000	1884-85..	5,317,000
1865.....	98,000	1878.....	940,000	1885-86..	5,953,000
1870.....	193,000 (?)	1879.....	1,551,000	1886-87..	6,375,000
1873.....	585,000	1880-81..	2,052,000	1887-88..	7,244,000
1874.....	727,000	1881-82..	3,142,000	1888-89..	5,740,000
1875.....	843,000	1882-83..	3,175,000	1889-90..	6,863,000
1876.....	1,000,000	1883-84..	4,046,000	1890-91..	7,434,000

(*Northwestern Miller*, March 19, 1880, p. 179; *Millers' Almanack*, 1923, p. 203.)

[3] St. Louis Merchants' Exchange, *Trade and Commerce of St. Louis* (1882), 76.

The hard wheat is mixed in Chicago . . . with soft to grade it up. To use Hungarian rollers the wheat must be homogeneous — all of one grade — and that grade hard wheat. So eastern millers can not now and never can make the fine patent flour which our Minneapolis millers make.'[1]

B. Large-Scale Production and Concentration of Ownership in the Minneapolis Mills

One of the forces which operated most powerfully to build up Minneapolis as a milling center at this time was *the growth of large-scale production.* Excepting in the year 1879–80, there was no considerable increase in the number of mills after 1876. The number of the smaller mills burned or scrapped just about balanced the number of new mills. Yet there was a great increase both in potential capacity and in actual output.[2] The increase was in the size of the mills as is strikingly apparent from the table given below.[3] At the beginning of the period (1870) a mill with a capacity of two hundred barrels a day was a large one; in 1890 only six of the twenty-four mills had less than a thousand barrels capacity. A similar development is characteristic of the industry throughout the United States, though nowhere else was the tendency so pronounced.

In 1870 it was not by any means clear that the large mills — meaning mills of more than three or four hundred barrels' capacity — had an advantage over the smaller ones. The large mill 'which could run exclusively on merchant work and hold its own in competition with the smaller mills, was the exception rather than the rule. The majority of the

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[1] *American Miller,* IX (1881), 23.

[2] See above, p. 127, notes 1, 2.

[3] Growth in size of Minneapolis mills:

1876	20 mills	242 bbls. av. daily capacity
1880	26	578
1884	23	1338
1888	25	1534
1890	24	1837

(Minneapolis Board of Trade, Minneapolis Chamber of Commerce *Annual Reports.*)

large mills were elephants on their owners' hands, while the little two and three-run mills throughout the country were making money for their owners.' [1] The difficulty Governor Washburn encountered in getting some one to run his first mill illustrated this truth.[2]

The smaller mills claimed certain advantages before 1880. Located in the heart of the wheat-growing regions, they were able to get the choicest grades at lowest prices. Their labor costs and other operating expenses were lower. When processes and equipment were relatively simple, the large millers had no advantage in machinery. Buying and selling as they did in a local market, the small millers were not exposed to loss from price fluctations to as great a degree as the large millers. After considering the relative advantages of large and small mills, *The Northwestern Miller* concluded in 1882: (*a*) that there were some mills, even then, too large to be handled economically; (*b*) that the small miller had no difficulty in securing the machinery necessary to keep abreast of the times; (*c*) that if the small millers would work scientifically, there was no reason why they should not be able to secure proportionately as large profits as the big millers.[3]

After 1880, however, the superior advantages of the large mills became more and more apparent. There was economy of construction and of operation in a thousand-barrel mill as compared with a smaller one.[4] The larger mills found it easier to secure more capital; as the processes became more complicated, it took much more capital to equip a mill properly.[5] The large mills could employ more and better managers and superintendents. They found it easier to market their mill-feeds. As to the buying of wheat, their larger capital and larger demand enabled them to buy over a larger area. Thus they were independent of local fluctuations in quantity and quality of wheat, whereas the small, local mill, when faced with a poor crop in its own immediate locality, usually had to shut down.[1] Then, the large mills were enabled to experiment with new machines and new methods in a way that was impossible to the small mills. In the same way the widely extended market to which they sold their products gave them advantages over the smaller mills. In marketing their product, the large mills could send out traveling salesmen and advertise their product, while the small mill was dependent on the honesty and zeal of the commission house.[2] The large mills had advantages of transportation also. They were usually able to get better car service and avoid transfer charges that were imposed on the small mill. Where a number of large mills were concentrated in a single city, as in Minneapolis, they were able to get special freight rates. This was perhaps most important of all.[3] And, lastly, the large mill had a clear advantage in the export trade. So long as the market was relatively small and undeveloped, the small miller probably had the balance of advantage in his favor. But when the market broadened to include most of western Europe, and single orders for ten thousand to fifteen thousand barrels became fairly common, the advantage clearly moved to the side of the large mills. To secure such orders it was necessary to control large manufacturing capacity to be able to fill the orders promptly and to make sure that the flour would be of uniform quality.[4]

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[1] *Northwestern Miller*, October 7, 1881, p. 252.

[2] See below, p. 132.

[3] *Northwestern Miller*, August 18, 1882, p. 123.

[4] Minneapolis Board of Trade, *Annual Report* (1880), 53.

[5] *Northwestern Miller*, October 7, 1881, p. 252.

Coincident with the growth of large-scale production was a *concentration of ownership* of the mills. In 1876 twenty mills were operated by seventeen different firms; in 1890 more than eighty-seven per cent of the milling capacity of the city was in the hands of four great corporations. This development, which we must now trace, was probably not the result of deliberate planning — there seems to have been no effort, at that time, to establish a monopoly — but rather the logical working-out of the economic forces of the period. We shall trace the rise of these corporations in some detail.

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[1] *Northwestern Miller*, August 18, 1882, p. 123. [2] *Ibid.*

[3] Minneapolis Board of Trade, *Annual Report* (1879), 50. See also Chapter V below.

[4] *Ibid.*

The Pillsbury Mills. First of these corporations was that of C. A. Pillsbury and Company — a monument to the business ability of Charles A. Pillsbury. Pillsbury was a New Hampshire man, a graduate of Dartmouth, who, after a brief career in the produce commission business in Montreal, followed his uncle, John S. Pillsbury, to Minneapolis.[1] Arriving there in 1869, he immediately purchased an interest in a milling firm of which he was made manager. The milling industry was in a depressed condition at the time,[2] but he had entered the business at a crucial moment and it was largely his energy and business ability which were responsible for the rapid growth of Minneapolis as a milling center. His connection with the first efforts to improve milling methods has been narrated.[3] His success led him to organize, in 1874, the firm of C. A. Pillsbury and Company, a family partnership, the new firm taking over the Taylor mill.[4] In 1875 Governor John S. Pillsbury bought the Anchor mill, which was thereafter operated by the firm.[5] In the same year the firm leased a mill-building which had formerly been a woolen mill, equipped it with flour-milling machinery and named it the Empire.[6] In 1878 Dorilus Morrison, having completed his new Excelsior mill, leased it to the Pillsburys.[7] Then in 1880 they put in operation the first section of the new Pillsbury A mill, which, when completed, was to be the largest flour-mill in the world.[1]

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[1] 'The Early History of New Process Milling,' *Northwestern Miller*, August 24, 1883, p. 174.

[2] *Ibid.*

[3] See above, p. 118.

[4] *Northwestern Miller*, Holiday Number, 1893, p. 42; March 18, 1881, p. 165.

[5] *Ibid.*, November 8, 1889, p. 515. The Anchor was burned in 1878, but rebuilt. *Ibid.*, December 13, 1878, p. 422.

[6] Atwater, *History of the City of Minneapolis*, part II, 613.

[7] *Ibid.*

In this period of great prosperity no other firm had grown so rapidly as the Pillsburys. Then disaster overtook them. In December, 1881, fire destroyed the Pillsbury B, the Excelsior, and the Empire.[2] The Empire lease was given up. When the Excelsior was rebuilt, Morrison decided to operate it himself. For a time only the Anchor and the A mill were left to uphold the Pillsbury reputation. However, the A mill was completed in 1883, the B mill rebuilt by 1884, and by 1889 the firm's three mills had a capacity of over ten thousand barrels a day.[3] To provide the necessary wheat supply, a terminal elevator with a capacity of 500,000 bushels and a system of country elevators had been built.[4] The marketing of 'Pillsbury's Best' had been pushed so energetically that by this time it had acquired an international reputation.[5]

The Washburn-Crosby Mills. Meanwhile there had grown up another firm with which the Pillsburys were in closest rivalry — the Washburn-Crosby Company. We have seen how Governor C. C. Washburn of Wisconsin became interested in the Minneapolis water-power in the decade before the Civil War; how he built the Washburn B mill in 1866, and have noted his difficulties in getting some one to operate it successfully;[6] how George H. Christian induced him to enter the partnership of George H. Christian and Company and lease the Washburn B to the firm has also been told.[7] When the Washburn A was completed the same firm operated it. Following the retirement of George Christian in 1875[1] there were a number of changes out of which grew the firm of Washburn, Crosby and Company (1879). The principal partners were Governor Washburn, John Crosby,[2] a Maine man who had amassed a considerable fortune in a foundry and machine shop at Bangor, and William Hood Dunwoody,[3] a Pennsylvanian, trained in the Philadelphia flour trade, and with years of experience in wheat-buying and milling as well. This firm gradually took over the operation of the three Washburn mills. After the death of Governor Washburn and of Mr. Crosby, the partners brought to Minneapolis James Bell, of the Philadelphia flour house of Samuel Bell and Sons, who then became the active head of the company.[4] In 1889 it was incorporated as the Washburn-Crosby Company. By that time the mills had a capacity of ten thousand barrels of flour per day and the corporation ranked next to the Pillsburys as the leading milling firm of the country.[5]

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[1] *Northwestern Miller*, April 8, 1881, p. 218.

[2] *Ibid.*, December 9, 1881, p. 418; December 23, 1881, p. 450; January 20, 1882, p. 40. *The American Miller*, x, 21, gives a list of the mills with their value and amount of insurance carried.

[3] Minneapolis Chamber of Commerce, *Annual Report* (1890), 135.

[4] These were controlled by a subsidiary, at first known as Pillsbury and Hulbert, later as the Minneapolis and Northern Elevator Company.

[5] For the development of marketing methods at this time, see Chapter V.

[6] Atwater, *History of the City of Minneapolis*, part II, 609.

[7] See above, p. 116.

The Washburn Mill Company. The third company is less important and may be disposed of very briefly. The Washburn Mill Company was founded by W. D. Washburn, brother of Governor Washburn and himself a Senator from Minnesota. He had come to Minnesota in 1857, acting as agent for the Minneapolis Mill Company during the building of the dam,[6] then entering the lumber business, building sawmills at Minneapolis and Anoka (Minnesota), and finally, in 1878, going into flour-milling. His first flour venture was the purchase of a small mill at Anoka, which in 1880 was replaced by the Lincoln mill of eight hundred barrels' capacity.[7] When this mill burned down in less than a year, the Palisade mill in Minneapolis was purchased to fill orders while the Lincoln was being rebuilt. By 1889 the two mills had a capacity of twenty-eight hundred barrels a day.[1]

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[1] Hudson, *Half Century of Minneapolis*, 335-36.

[2] Atwater, *History of the City of Minneapolis*, part II, 588.

[3] Hudson, *Half Century of Minneapolis*, 343-44.

[4] *Northwestern Miller*, January 12, 1894, p. 48.

[5] Minneapolis Chamber of Commerce, *Annual Report*, 1892.

[6] *Northwestern Miller*, January 12, 1894, pp. 45-49.

[7] *Ibid.*, November 8, 1889, p. 549.

The Pillsbury-Washburn Flour Mills Company. After the prosperous years of the introduction of roller-milling there came a pause — a period of depression. From 1883 to 1887 flour prices declined steadily. Competition became more severe as output increased, and the millers began to compete for a nation-wide market.[2] Then, in the fall of 1888 there was a sharp reaction in which, as one of the millers stated, 'you could sell anything.'[3] It was in this period that an English syndicate attempted to buy up the leading Minneapolis mills. There is evidence that the severe competition of the preceding years had cut profits to such an extent that many of the millers were willing to sell.[4] On the other hand, the growth of Minneapolis flour exports to English markets, the wide publicity secured by C. A. Pillsbury and other Minneapolis millers, the large amounts of English capital seeking investment — all these combined to make such a purchase seem desirable to the English.[5] After some negotiations, the syndicate purchased the three mills of C. A. Pillsbury & Company and the two mills of the Washburn Mill Company — a total of 14,500 barrels' capacity. In addition, they purchased the stock of the two water-power companies and the Minneapolis and Northern Elevator Company, thus giving them control of the water-power of St. Anthony Falls, of large terminal elevator capacity, and of a line of country elevators in northern Minnesota and North Dakota. The Pillsbury-Washburn Flour Mills Company Ltd. was then (1889) organized in England. C. A. Pillsbury was made managing director and the Pillsburys purchased considerable stock in the new company.[1]

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[1] Minneapolis Chamber of Commerce, *Annual Report* (1890), 135. For the purchase of the Palisade mill, see *Miller and Manufacturer*, I, 259 (September 20, 1884).

[2] *Northwestern Miller*, November 28, 1884, p. 510.

[3] Conversation with a Minneapolis miller.

[4] *Northwestern Miller*, November 8, 1889, p. 521.

[5] *Ibid.*, November 8, 1889, p. 521.

The English company next attempted to purchase the C. C. Washburn mills which were being operated by the Washburn-Crosby Company,[2] but the old rivalry between the Pillsbury and the Washburn interests prevented the consummation of this plan.

Public feeling in Minneapolis was pleased at the failure to acquire the C. C. Washburn mills, since the English company was not very popular there.[3] The consolidation, moreover, seemed to be a source of danger to the independent mills. Said *The Northwestern Miller:* 'As for the other millers in Minneapolis, they have clearly but two courses open to them, either to combine for self-protection, or to get in under the wings of the English company. If they do not fully realize this now, the time is not far off when they will be forced to do so.'[4] The combination with the Washburn-Crosby mills, which so alarmed *The Northwestern Miller*, was not formed, as we have seen. Nor is there any evidence that the Pillsbury-Washburn Company was guilty of unfair competition, or attempted to get the other mills 'under its wings.'[5] But the conditions of the industry were forcing the independent mills into combination. Through 1890 there were rumors of more consolidations and combinations. 'The tendency of the hour is undoubtedly toward a centralization of capacity and a combination of forces,' said *The Northwestern Miller.*[6] The large profits of the early eighties had been followed by overbuilding, overproduction, sharp competition, price-cutting, and loss of profits in a familiar series. As early as 1884 attempts began to be made to restrain competition. In that year there was an attempt to get all the Minneapolis mills to limit production to two thirds of capacity.[1] As the letters given below indicate, there were attempts to form a selling pool also.[2] There were similar attempts at combination in other milling centers, particularly at St. Louis.[3] *The Northwestern Miller* claimed that the economies of large-scale production were so great that they forced every miller to enlarge his plant and to attempt to keep it fully occupied. This resulted in overbuilding, overproduction, and price-cutting for which combination was the only remedy. 'Every mill recently built has increased its capacity, not because it had to meet an increased demand but solely because of the less cost per barrel of the big mills.'[4]

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[1] Moody, *Manual of Railroad and Corporation Securities*, Industrial and Public Utility Section, 1914.

[2] *Northwestern Miller*, June 6, 1890, p. 597; August 1, 1890, p. 119.

[3] *Ibid.*, June 6, 1890, p. 597.

[4] *Ibid.*

[5] *Ibid.*, April 24, 1891, p. 535.

[6] *Ibid.*, July 25, 1890, p. 87.

The Northwestern Consolidated Milling Company. Such were the conditions that led to the formation of the Northwestern Consolidated Milling Company in 1891. The mills in the combination were the Galaxy, Columbia, Crown Roller, Zenith, Northwestern, and Pettit, with a total capacity of 11,400 barrels. The leader of the movement was A. C. Loring, of the Galaxy.[5] There was no difficulty in getting the other mills to agree to a combination, but there were the usual difficulties in determining the relative values of mills, brands, good-will, etc.[1] The Crown Roller and the Pettit mills were purchased outright from the proceeds of bond issues; the other mills were obtained by an exchange of stocks.[2] It seems clear that the chief motive for the combination was to escape the pressure of undue competition. When a stockholder of the Sidle-Fletcher-Holmes Company, owners of the Northwestern and the Zenith mills, sought to prevent the formation of the combination by injunction, the officers of the company answered that it had lost $20,000 on the previous year's business (1889-90), and $150,000 the year before; that no dividends had been paid since 1885, and that .the company was practically insolvent. Hence there was nothing to do but sell out to the new combination.[3] It was claimed by the promoters that they had secured the properties below cost, but it is probable that they paid more for them than their actual market value at the time. When in 1899 the Washburn-Crosby Company purchased the mills which they had operated under a lease for so long a time, it was reported that they paid about one hundred dollars per barrel of capacity.[4] Making all allowances for changes in business conditions between 1891 and 1899 and for the more advantageous position of the Washburn-Crosby Company in the world's markets, one hundred dollars per barrel of capacity does not seem to be an unfair standard to apply to the Northwestern Consolidated. On that basis the new company paid far more for the properties than they were worth.[5] Moreover, the management, instead of being centralized in the president, was divided between three managing directors, representing three of the old firms. And, lastly, the company seems to have been insufficiently provided with working capital.[1] It is not surprising, therefore, that a reorganization was soon found necessary.[2] Meanwhile, however, the new company, with a capacity surpassing that of Washburn-Crosby and almost equaling Pillsbury-Washburn, soon made its 'Ceresota' brand familiar in the world's markets.

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[1] *The Miller and Manufacturer*, I, 30 (January 15, 1884).

[2] W. D. Washburn to Major Hale, June 28, 1884:

'There is one of two things to do, which we will determine as soon as I reach home, first to abandon the Palisade lease, and run the Lincoln Mill, selling our flour in a pool; second to retain the Palisade and run both mills "red-hot" and for all there is in them, and have a wide-awake, aggressive organization and "carry the war into Africa." The second, as I now feel, would be my plan.' (Minnesota Historical Society, Hale Papers (MS.).)

W. D. Washburn to Major Hale, June 29, 1884:

'The more I consider the subject, the better I am satisfied that we should "paddle our own canoe," and sell our own goods. We might perhaps sell in a pool for a time, but we would stand a chance of being left out at any time, in the meantime having lost our trade.' (*Ibid.*)

W. F. Thayer to Major Hale, March 15, 1887:

'We hope the mills won't combine and if they do I fail to see how they can succeed. It would result in bringing all the outside mills to the front to buck against the combine which the trade would favor, as they are opposed to monopolies and would encourage competition.' (*Ibid.*)

[3] *Milling*, I, 543–44.

[4] *Northwestern Miller*, November 27, 1891, p. 753.

[5] *Ibid.*, June 28, 1899, p. 1228.

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[1] *The Northwestern Miller*, November 27, 1891, p. 853, contains a complete account of the new corporation.

[2] *Ibid.*

[3] *Ibid.*, June 5, 1891, p. 785.

[4] *Ibid.*, May 31, 1899, p. 1027.

[5] The 11,400 barrels' capacity at $100 per barrel would mean a value of $1,140,000. The new company paid in cash and stock, $1,830,000. (*Northwestern Miller*, May 15, 1891, p. 651; July 24, 1891, p. 103; June 19, 1891; June 26, 1891, p. 861.)

The Minneapolis Flour Manufacturing Company. One other combination may be treated but briefly. This was the Minneapolis Flour Manufacturing Company, which was formed in 1889 to acquire the Excelsior, Standard, and St. Anthony mills.[3] The Excelsior and the Standard had been built by Dorilus Morrison, a pioneer lumberman who had come to Minneapolis in 1854, had become interested in the water-power there and, to utilize it, had built a number of sawmills, as well as these flour-mills.[4] When the Standard was built in 1880, he formed a partnership with a La Crosse miller, named E. V. White, to operate it.[5] After a few years White retired and the firm became D. Morrison and Company.[6] The third mill in the combination was the old Arctic, built in 1866 and, after many vicissitudes, remodeled in 1881 and renamed the St. Anthony.[7] It was acquired in 1883 or 1884 by the firm of Morse and Sammis. For a time also they operated the Union mill as well. The same conditions and tendencies that forced the establishment of the Northwestern Consolidated were behind this combination. The announcement of its formation followed soon after the announcement of the Pillsbury-Washburn Company purchase. The three mills had, in 1890, a capacity of 3500 barrels.[8]

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[1] *Northwestern Miller*, June 28, 1899, p. 1227.

[2] See below, p. 167.

[3] *Northwestern Miller*, November 27, 1891, p. 783.

[4] Hudson, *Half Century of Minneapolis*, 311–12.

[5] *Northwestern Miller*, January 7, 1881, p. 6.

[6] Minneapolis Board of Trade, Minneapolis Chamber of Commerce, *Annual Reports*.

[7] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 32.

[8] Minneapolis Chamber of Commerce, *Annual Report* (1890), 134–35.

C. Organizing an Industry: Capital Sources, Wheat Supplies, and Transportation Facilities[1]

1. *Capital.* The concentration of ownership which we have traced was the final step in the development of a thoroughly capitalistic form of industry. This fact naturally raises the question of the sources of the supplies of capital for the Minneapolis mills. It was the lumbermen who first settled the village of St. Anthony. That village, with its tributary logging-camps and agricultural villages, provided both the market and the supplies of raw materials for the mills.[2] The sawmills provided the capital to build the flour-mills. The location of the flour-mills and the sawmills side by side on 'the platform,' both driven by the water-power of the falls and often under common ownership, was symbolic of the close connection between the two industries.[3] After 1875 the lumbering industry moved away from the falls into the northern part of the city. Coincident with this movement there seems to have been a change in the personnel of the industry, new firms coming in and old ones dropping out. Many of these older firms — or, at least, the men in them — turned to flour-milling and clearly transferred a larger amount of capital to that industry.[4] Of the firms operating flour-mills in Minneapolis in 1876, probably the majority had had some experience in the lumber industry.

There is little evidence indicating a migration of millers and milling capital from older centers. The transfer of capital would not be as easy or as natural in this industry as in lumbering, since there was less likelihood of an exhaustion of raw materials, and the investment in buildings and power, which would have to be abandoned, was very much greater. On the other hand, there is a good deal of evidence to indicate a transfer of capital from the marketing end of the business to manufacturing; from the flour-houses in the Eastern markets to the mills of the West. George H. Christian and William H. Dunwoody are outstanding examples of millers who were trained in the Eastern flour markets before entering flour-milling. Doubtless they brought considerable capital with them. The same is true of James S. Bell, who was the head of the Philadelphia firm of Samuel Bell and Sons when he was induced to come West to join the Washburn-Crosby Company.

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[1] Much of the discussion in this section is based upon the author's 'The Influence of the Minneapolis Flour Mills upon the Economic Development of Minnesota and the Northwest,' *Minnesota History*, VI, 141-54 (1925).

[2] See above, p. 108.

[3] Compare the lists of pioneer lumbermen and lumbering firms in Stanchfield, 'History of Pioneer Lumbering on the Upper Mississippi' (Minnesota Historical Society, *Collections*, IX, 348-50), with the lists of firms operating flour-mills in the Minneapolis Board of Trade, *Annual Reports.*

[4] Hudson, *Half Century of Minneapolis*, 288-89.

The mills, once started, seem to have grown mainly from reinvested profits. Up to 1889 there were no considerable investments by outside owners. The mills were owned and operated by Minneapolis men, the only important exception being Governor Washburn of Wisconsin. In 1889 the Pillsbury-Washburn Company made the first large investment of foreign capital in the mills. Even in this case, although the corporation was a foreign one, large amounts of stock were owned by Minneapolis men who were, of course, the active managers. At the time of the fight against the milling trust,[1] these investments seem to have been largely increased, so that it was asserted that these American stockholders controlled the corporation. In any case the re-financing in 1924 has resulted in the absorption of the Pillsbury-Washburn Company by the Pillsbury Flour Mills Company, which is a purely American corporation, whose officers and directors are all Minneapolis men.

The financial development of the milling corporations is, of course, intimately connected with the growth of banking in Minneapolis. The great scarcity of capital for investment in fixed plant made it necessary to do business on bank credit to a greater degree, perhaps, than is possible to-day.

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[1] See below, p. 167 ff.

Hence the millers early found it necessary to control the larger banks of the city. Moreover, whenever the millers had exhausted the credit supplies of the local banks, they were able to utilize those of the banks with which their Eastern marketing agencies were connected. In any case, by 1880 it had become customary for these firms to float their commercial paper in all the Eastern monetary centers, but especially in New York City and Boston.

2. *Wheat Supplies.* We have seen that the first merchant mill in Minneapolis was obliged to bring in wheat from the older States. This situation could not have lasted more than a year or two, however, since wheat production increased very rapidly in the counties nearest Minneapolis after 1860. On the other hand, the mills soon outgrew the wheat production of the immediate locality. We know that much of the supplies, before 1860, came by wagons, probably mainly from Hennepin County, in which Minneapolis is located. But by 1860 the Minneapolis mills were using twice as much wheat as the county produced. In the following years, wheat production in the immediate locality remained stationary while mill consumption increased enormously. By 1878, for example, 283,786 bushels are reported as 'Minneapolis street wheat,' and 288,000 as 'purchased at the mills,' [1] indicating that not much more than half a million bushels out of a total of nearly three and a half million was delivered by teams from local sources.

By that date the problems of marketing, financing, and storing wheat had become serious. The growth of the elevator system lagged behind the advance of the wheat area.

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[1] Minneapolis wheat receipts — September 1, 1877, to February 1, 1878:

Via Minn. & St. Louis Ry....	810,543	Purchased by Individual Millers from Outside Association Territory —	
St. Paul & Sioux City R.R.	664,635	Milwaukee & St. Paul R.R. M. & I. Division.......	257,380
St. Paul & Pacific R.R....	447,267	Minn. & Duluth, to White Bear..................	43,510
Milwaukee & St. Paul R.R. M. & I. Division.......	461,185	Purchased at mills.......	288,000
Hastings & Dakota Div.	206,895		
Minneapolis Street Wheat.	283,786		
Total purchased in Association Territory.......	2,874,311	Aggregate...............	3,463,201

(*Minneapolis Tribune*, March 5, 1878.)

As late as 1879, when the mills were using seven million bushels of wheat annually, there were only two public elevators in Minneapolis, with a capacity of 215,000 bushels.[1] In part this was due to the fact that the mills took almost all the wheat so that little was shipped eastward. But the mills had little storage space of their own. They preferred to go into the country districts and buy their wheat as it was needed. In doing so they faced severe competition with one another and with Milwaukee and Chicago buyers, especially in the spring of the year when supplies were low. To get around this, the Minneapolis Millers' Association was organized. The date of its formation is unknown, but certainly it was before 1869,[2] although it was not incorporated until 1876. Essentially it was a buying pool of which eighteen out of twenty Minneapolis mills were members, with William H. Dunwoody as the dominant spirit and the active head in the later years at least.[3] He controlled the buyers at all interior points and dictated the prices they should pay. He parceled out the wheat to the different mills on its arrival in Minneapolis. For a time the Association had a practical monopoly in most of Minnesota. 'It is well understood . . .' writes a contributor to *The St. Paul and Minneapolis Pioneer Press*,[4] 'that the Millers' Association will not let any outside buyers come in to compete with them, that they will run up prices on them so as to drive them out.' As a result of this situation the farmers soon began to complain of low prices.[5] Their principal complaint, however, was against the system of grading and inspection in use at the time. Under this system, they claimed, much of their number 2 wheat was being graded down to number 3 or number 4.

The differences between millers and farmers came to a head in the 'brass-kettle' campaign of 1878. W. D. Washburn was the regular Republican candidate for Congress from the Minneapolis district. The farmers were inclined to support Ignatius Donnelly against him. Donnelly chose to make the fight on the Millers' Association.[1] The farmers demanded first that the brass tester which was used by the grain inspectors be done away with; second, that the millers pay for wheat according to its milling value, and third, that the inspectors be made independent of the Millers' Association.[2]

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[1] Minneapolis Chamber of Commerce, *Historical Sketch*, 33.

[2] *The Minneapolis Tribune*, March 19, 1869, notes that an Association buyer has just purchased 50,000 bushels of wheat at St. Peter.

[3] *Northwestern Miller*, December 31, 1880, p. 434.

[4] October 5, 1878.

[5] *St. Paul Pioneer Press*, October 8, 1878.

The millers could hardly deny that they were monopolizing the wheat supplies, but they did deny that they were depressing wheat prices unduly, quoting figures to show that they were paying relatively higher prices than were obtainable in Milwaukee and Chicago. As to the grading, they insisted that they had nothing to do with it, as that was taken care of by the elevator men.[3]

The farmers were beaten in the election, but the episode led to the establishment of a State system of inspection and grading in 1885. Meanwhile, mindful of the fact that the misdeeds of the elevator men were being laid at their door, the millers began to build or buy chains of elevators — both country house and terminal. Thus a very considerable increase in elevator capacity was brought about, and the millers were in a better position to buy the farmer's wheat in the fall when he was eager to sell.[4]

New conditions were making the millers' monopoly untenable in any case. On the one hand, they found they could no longer rely solely on spring wheat. As early as 1880 they began to complain of the deterioration in the quality of Minnesota wheat. The farmers were said to have tried to increase their yields by planting softer varieties, but these, according to the millers, proved poor in milling quality. The millers tried to offset this by offering a premium for Red Fife wheat, but with little success.[1] On the other hand, the advance of milling technique was teaching them the advantages of mixing many different kinds of wheat. They began to purchase in widely separated sections of the country, where there was no possibility of their controlling the wheat supplies.[2] The continued opposition of the farmers, which led in 1879 to a legislative investigation of the Association, doubtless also had its effect.[3]

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[1] Folwell, *Minnesota, The North Star State*, 315-16.

[2] *St. Paul Pioneer Press*, October 15, 1878.

[3] *Ibid.*, October 5, 1878.

[4] *Minneapolis Tribune*, August 29, 1880; *Northwestern Miller*, December 30, 1881, p. 465; Hudson, *Half Century of Minneapolis*, 356.

By this time there had arisen in Minneapolis a group of grain merchants who bought wheat for mills in the Middle and Eastern States. At first they were handicapped by the lack of storage facilities and the opposition of the millers' organization. This led them to organize the Minneapolis Chamber of Commerce in 1881.[4] It prospered from the first, in spite of the millers' opposition, for by this time the area of wheat-growing and the wheat supplies had grown too large for the millers to control. So after a few years the millers ceased their opposition, dissolved their Association, and bought their wheat on the Chamber of Commerce floor thereafter.[5] From 1883 to 1894 all the presidents of the Chamber were selected from the milling interest.

Meantime Minneapolis had risen rapidly to a leading position among the country's wheat markets. Up to 1881 practically all of the wheat shipped to the city was milled there. In no year, up to that time, were more than 200,000 bushels shipped out. In 1881 the shipments were 500,000, in 1882 2,000,000, in 1884 4,000,000, in 1886 6,000,000, in 1888

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[1] *Northwestern Miller*, June 6, 1879, p. 347; March 10, 1882, p. 155; *Minneapolis Tribune*, January 5, 1880.

[2] *Ibid.*, March 31, 1882, p. 208; April 7, 1882, pp. 226, 233.

Shipments of wheat were received from Nebraska and Kansas, from California and from Canada. See also the testimony of Secretary Sturtevant, of the Minneapolis Chamber of Commerce, before the United States Tariff Commission (*Report*, 1882, I, p. 1095 ff.).

[3] *Ibid.*, February 7, 1879.

[4] Minneapolis Chamber of Commerce, *Historical Sketch*, 8.

[5] *Northwestern Miller*, June 24, 1881, p. 411.

12,000,000, in 1891 21,000,000 bushels.[1] Along with this there was an increase in elevator capacity. In 1883 it was 2,500,000 bushels, in 1885 nearly 10,000,000, in 1890 16,000,000 bushels.[2] By that time the city claimed to be the greatest primary wheat market in the world.[3]

Having dissolved the Association, the millers were anxious to cultivate the good will of the Minnesota farmers. On the one hand, they were anxious to improve the quality of Minnesota wheat. On the other, the problem of disposing of the mill-offals was growing more and more serious. A growth of diversified farming in Minnesota might solve both problems. Nor need it cause a decline in wheat production, since larger yields might compensate for smaller acreage. While the charge has been made that Minneapolis because of its milling industry, had stood for a one-crop system, while St. Paul has represented the true interests of the farmer in pushing cattle-growing, and, consequently, diversification of crops, the little evidence available on this point indicates that the millers helped, rather than hindered, the growth of diversified farming in Minnesota.[4]

The farmers then transferred to the Chamber of Commerce the enmity which they had formerly felt toward the millers. The latter now bought all their wheat on the exchange and took no more responsibility for grades or prices. The grading was now done by inspectors appointed by the Chamber of Commerce. The opposition of the farmers to the system, referred to above, called for the adoption of a State system of grading and inspection. The opposition of the millers and the Chamber of Commerce to State control delayed, but could not prevent, the final adoption of such a system.[5] The law was finally passed in 1885 and the system has continued to this day.[1]

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[1] Minneapolis Chamber of Commerce, *Annual Reports.*

[2] Minneapolis Chamber of Commerce, *Annual Reports.*

[3] *Ibid.* (1887), 12.

[4] See the editorials in favor of diversified farming in the *Northwestern Miller*, February 1, 1878; June 6, 1879, etc.

[5] *Northwestern Miller*, January 14, 1881, p. 18; September 17, 1880, p. 178; February 11, 1882, p. 82, etc.

The enmity between the farmers and the Chamber was partly a result and partly a cause of new developments in the organization of the grain trade after 1880. Before 1890 there had been developed the three types of country elevators which we have to-day, namely, independent houses, line elevators, and farmers' elevators. Many of these farmers' elevators were built as a result of the opposition to the Millers' Association. Most of them were badly organized and poorly managed and, consequently, became financial failures. Their failure, for a time, left the field to the independents. But in the eighties, the line elevator companies came to dominate the situation. Having large capital they could control a 'line' or 'string' of elevators through a very large area. They could control terminal elevators in the central markets. Since they owned seats on the exchange, they could dispense with the services of the commission men. Often they had financial connections with the railroads on whose lines they operated, and were in a position to secure discriminating rates from those lines. In one way or another they gradually drove out the independents in large sections of the wheat area. Their monopoly of the terminal elevators not only enabled them to fix prices to which the farmer had to submit, but they gained a further profit through the grading system. They were able through their monopoly to buy on rigid grading and then, by mixing good grain with inferior, to reap large profits on 'skin' grades. Such, at least, were the claims made by the farmers. In 1892 *The Chicago Herald* and *The St. Paul Globe* started a campaign against the

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[1] *Minnesota Session Laws*, 1885, chap. 144. Regulation of elevators and warehouses begins in Minnesota as early as 1871. See *Session Laws*, 1871, chap. 25. Under the United States Grain Standards Act of 1916 the Secretary of Agriculture is given authority to establish grain grades and to license inspectors. In practice this has meant that the State grain inspection departments have continued to function as before. For an account of the history of the system, see the Federal Trade Commission, *Report on the Grain Trade*, II, chap. 6.

Minneapolis elevator men, and especially against C. A. Pillsbury, on this score.[1] The agitation led to a drastic regulatory act which declared all warehouses on railroad rights-of-way to be public warehouses and placed them under the supervision of the State Railroad and Warehouse Commission. Arrangements were made by which the farmer could store his grain in the country elevator and then sell either at Duluth or Minneapolis, thus giving him a choice of markets. Pooling and price-fixing agreements at country elevators were forbidden. The railroads were compelled to allow the erection of farmers' elevators on their rights-of-way.[2]

By that time the farmers had perfected a new method of organization and their elevators became financially successful in the great majority of cases. In recent years both the independent and the line elevators have declined in numbers and importance, while the coöperatives have steadily increased. In 1920 they were handling nearly forty per cent of all the grain shipped in Minnesota.[3] They were having no difficulty in getting commission men to handle their grain. Many of them were 'hedging' their purchases on the exchange. All these things have brought these representatives of the farmers closer to the Chamber of Commerce, and have contributed to a better understanding between them.

On the whole, the millers have benefited by the growth of this new marketing organization. Now that they buy their wheat on the exchange, where they must meet the competition of the outside millers and the grain shippers, they can no longer control the price.[4] On the other hand, they have a wider choice in wheat-buying; they need no longer confine themselves to the wheat of a particular area, whether that is good or bad. Some of the largest milling companies have disposed of their country elevators for just this reason, preferring to buy only on the exchange.[1] There they know they are dealing only with responsible people and need fear no encumbrances to the title of the grain they buy.[2] The tendency, already referred to, to gather wheats from other parts of the country in order to secure a stable mixture, worked to the same end, since buying directly from the producer is impossible under such conditions. Thus the millers became more and more dependent on the Chamber of Commerce.

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[1] *United States Miller*, October, 1892, p. 231.

[2] *Minnesota Session Laws*, 1893, chap. 64.

[3] *Minneapolis Journal*, January 26, 1920. In 1926-27 they shipped 48.8 per cent of all grain. Minnesota Railroad and Warehouse Commission, *Report*.

[4] Smith, *Wheat Fields and Markets of the World*, 313.

The growth of the Chamber drew to it the great line elevator companies — not only those operating in Minnesota and the Dakotas, but also those of Nebraska, Kansas, and Iowa.[3] At first the Chamber was purely a cash market, but after 1890 the future sales developed greatly.[4] By 1910 the Chamber of Commerce ranked second to the Chicago Board of Trade among the grain exchanges of the country.

The new marketing organization was also an important factor in making Minneapolis the financial center of the Northwest. The mills now grind normally about 65,000,000 bushels of wheat a year;[5] about 40,000,000 additional are received and shipped by the terminal elevators. The bulk of this wheat is rushed to market in the months from September to December.[6] Minneapolis millers and grain men must purchase and store this grain, either in the interior or at the terminals, until it is needed for grinding. Since the grain must be paid for in cash, not less than $50,000,000 to $75,000,000 must be provided to finance the operation.[7] Naturally, the millers and grain men turn first to the Minneapolis banks. As early as 1883 Minneapolis bank clearings averaged $4,000,000 or $5,000,000 higher during the last four months than for the rest of the year.[1] By 1913 this expansion of clearings above the normal had jumped to $10,000,000 a week.[2] Most of this increase was due to the financing of the grain movement. The millers and grain firms sell their grain paper to the banks — or borrow with warehouse receipts as collateral — and receive credit or currency with which to purchase more grain. The bank, in turn, rediscounts with Eastern banks and thus draws money to Minneapolis. But the grain firms do not have to depend on the local banks alone. Much of their grain paper is taken by commercial paper brokers and scattered throughout the United States and Canada. Thus enormous financial resources are concentrated in Minneapolis during these months. As early as 1889 the Chamber of Commerce report stated: 'Nearly all the money paid for grain in the interior is sent from the city by elevator companies and millers, to their agents in the country. Thus Minneapolis is not only the market to which the grain is shipped and where it is sold, but the financial center from which the money is sent out, to purchase and move the grain crops of the Northwest.'[3]

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[1] Conversation with a prominent miller.

[2] Smith, *Wheat Fields and Markets of the World*, 265.

[3] Minneapolis Chamber of Commerce, *Annual Report* (1891), 53.

[4] *Ibid.* (1890), 48.

[5] Average consumption 1920–26.

[6] Minneapolis Civic and Commerce Association, *Minneapolis: Financial Center and Gateway of the Northwest*, 48–49.

[7] Smith, 'Minneapolis and the Northwest,' *Harper's Weekly*, April 26, 1914, p. 14. The writer was a member of the editorial staff of *The Northwestern Miller*.

3. *Transportation facilities.* All this growth of the wheat area would have been of little avail had there not been built up, during the same period, a transportation net with Minneapolis as a center. At first the city was mainly concerned with transportation to the Eastern markets. Up to 1867 these shipments were made by steamboat down the Mississippi River, to St. Louis in the earlier days, later to various river ports whence railroads led to Milwaukee or Chicago. Thus Dunleith near Galena was first important with its line to Chicago; then Prairie-du-Chien, connected by rail to Milwaukee, took the lead. The steamboats at first all stopped at St. Paul, whence freight was hauled by team to

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[1] Minneapolis Chamber of Commerce, *Annual Report* (1883), 120.

[2] Minneapolis Civic and Commerce Association, *Minneapolis: Financial Center and Gateway of the Northwest*, Table XII.

[3] Minneapolis Chamber of Commerce, *Annual Report* (1889), 48-49.

Minneapolis. In 1852 the Dr. Franklin No. 2 demonstrated that ships could come up to Minneapolis, and the citizens agreed to give her captain a bonus for doing so regularly.[1] Citizens of Minneapolis and St. Anthony were enthusiastic over this steamer service. In 1857 it was claimed that there were fifty-two arrivals of steamers at the falls during that summer. Meanwhile, there were three steamers running on the Mississippi above the falls, and river steamers were bringing wheat from the Minnesota River up the Mississippi to Minneapolis.[2]

The enthusiasm for steamship service seems to have lasted until 1870 at least. In 1869, for example, *The Minneapolis Tribune* argued for the need of lines of river steamers as a defense against the monopoly of the Milwaukee and St. Paul Railway.[3] These should include not only steamers to carry their flour down the Mississippi, but also boats on the St. Croix and the Minnesota Rivers to bring in wheat. As things stood, the millers had no transportation facilities into the wheat area; if they refused to ship their flour on the Milwaukee Railroad, that company then sent out buyers to buy up the wheat and ship it out of the State. But this enthusiasm for the steamers died down when it was learned that they were combining with the railroads to fix rates[4] for the summer months. The completion of direct rail connection to Chicago and the East in 1871 provided a service which the steamers could not equal. After that, though there were occasional shipments by river,[5] and potential river competition doubtless had some effect on rates, the Chicago and Milwaukee bound shipments went mainly by rail.

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[1] *St. Anthony Express*, June 18, 1852.

[2] *Minneapolis Tribune*, May 22, 1869.

[3] *Ibid.*, May 6, 1869.

[4] For example, *The Minneapolis Tribune*, March 6, 1869, notes a meeting of railroad and steamship men at Chicago on March 3, called for the purpose of fixing summer freight rates. There was a similar meeting in 1870. (*Ibid.*, March 26, 1870.)

[5] *The Millers' Journal*, XIII, 168 (February 25, 1880), states that Minneapolis warehouses contain over 20,000 barrels of flour which the millers are holding back awaiting a reduction in rates to the East. 'If not before, this great amount of flour will certainly be shipped as soon as navigation of the Mississippi opens.'

Meanwhile, however, the millers were turning toward Lake Superior as an alternative route to the Eastern market. The Lake Superior and Mississippi Railroad had completed a line from St. Paul to Duluth in 1870.[1] The people of Minneapolis tried ineffectually to have the southern terminus of the road in their city and, failing in this, organized the Minneapolis and St. Louis Railway Company. The first construction of this company was northward to White Bear, where it connected with the Lake Superior and Mississippi. When this line was finished in 1871, the millers were in a better position to take advantage of the Lake Superior route.[2] In the same year the company built a line southward to Carver on the Minnesota River, where it intercepted wheat shipments coming east on the St. Paul and Sioux City line,[3] and in the following year secured direct connection into St. Louis.[4]

However, the weakness of the Lake Superior route was that it was open only part of the year. As early as 1873, Governor Israel Washburn of Maine, brother of C. C. and W. D. Washburn, in an address to the Minneapolis Board of Trade, urged the desirability of a direct railroad connection with the East via Sault Sainte Marie. Such a road would not only free Minneapolis from the dominance of the railroads centering in Chicago and hostile to their milling interests, but would give them a shorter route to the Atlantic Coast, and open up a rich territory in Wisconsin and Michigan, which was naturally tributary to Minneapolis. *The Northwestern Miller* at first ridiculed the idea in an editorial entitled 'The North Pole Railway.' [5] It was not until 1883 that the project was started, and then only with financial assistance from the Canadian Pacific Railway.[1] The Minneapolis, Sault Sainte Marie and Atlantic Railroad Company was organized, with W. D. Washburn as president, C. A. Pillsbury, vice-president, and J. K. Sidle, John Martin, C. M. Loring, W. W. Eastman, W. D. Hale, and C. J. Martin — all prominent millers — on the Board of Directors.[2] Construction was begun in 1885 and Sault Sainte Marie reached in 1887. Meantime, the Canadian Pacific had built a line through to Sault Sainte Marie from Sudbury, Ontario, and beginning in January, 1888, through train service was established between Minneapolis and Montreal and Boston. The importance of this line to the millers is apparent from the fact that in its first year of operation it carried nearly a million barrels of flour to the Eastern market — roughly one seventh of the Minneapolis output. In its second year the millers shipped over this line nearly half a million barrels more than by any other railroad.[3]

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[1] Now owned by the Northern Pacific.

[2] *Minneapolis Tribune*, July 23, 1871. Account of the opening of the line to White Bear.

[3] *Ibid.*, November 15, 1871.

[4] *Ibid.*, January 20, 1872.

[5] *Northwestern Miller*, June 13, 1879, p. 363.

Turning now to the roads running into the wheat-fields, we note that, with two exceptions, there is little evidence to show a conscious effort on the part of the millers to build them. They seem to have had no considerable part in the westward extension of the Great Northern, the Northern Pacific, or the Milwaukee Railroads. Probably they found it unnecessary to do so, since Minneapolis was the natural center for those lines. Before 1880 all the main lines leading from the Red River and Minnesota River Valleys had been centered in Minneapolis. The territory due south of Minneapolis, however, had no rail connections with the city until the extension into it of the Minneapolis and St. Louis, referred to above. This road, like the 'Soo Line,' was very clearly a millers' enterprise, although the desire of the lumbermen to find an outlet to the South was doubtless also an

[1] Hartsough, *The Twin Cities as a Metropolitan Market*, 87–88.

[2] Atwater, *History of the City of Minneapolis*, 330. Atwater himself took a prominent part in some of these railroad enterprises, particularly the inception of the Minneapolis and St. Louis.

[3] Minneapolis Chamber of Commerce, *Annual Report* (1889), 157; *ibid.* (1890), 191.

important motive for its building. W. D. Washburn, first a vice-president, was later president of the company. J. S. Pillsbury, W. W. Eastman, J. K. Sidle, R. P. Russell, W. P. Ankeny, John Martin, and Paris Gibson — all prominent in milling — were members of the Board of Directors.[1] The other exception was the westward extension of the Soo Line, which seems to have been dictated by fear of the efforts of the Great Northern Railway to divert wheat supplies to Duluth.[2]

The effect of this building on the railroad rate situation and the transportation question generally will be considered in another connection. Here we are concerned only with the growth of the Minneapolis wheat supplies and flour markets as a result of better facilities for transportation. Summarizing, we may say that the growth of Minneapolis as a railway center was mainly a natural growth over which the millers exercised little direct influence though the flour business was a prominent factor. In some cases, however, and especially in those of the Soo Line and the Minneapolis and St. Louis, the millers did have a direct part in the building of the roads and benefited directly by their success.

IV. SUMMARY

The development of flour-milling at Minneapolis was, up to 1870, simply a part of the larger movement — the growth of milling throughout the spring-wheat area. The start was due to the available water-power and the home-market demand created by the presence of the lumber industry. As wheat-growing developed throughout the tributary area, the mills grew in size and numbers and began to ship to the Eastern markets. But it was the revolution in milling processes which resulted from the introduction of the purifier and the roller system which brought supremacy to the Minneapolis mills. Neither was an American invention though the purifier was perfected in Minneapolis by La Croix and Smith, but their introduction brought supremacy to American flour in the world markets, especially to American spring-wheat flour. The Minneapolis millers took the lead in introducing the 'New Process' and the roller-mills and so reaped the greatest benefit. They were the better enabled to do this because during the same period (1870–90) there was a growth of large-scale production and a concentration of ownership in the Minneapolis mills, which, while characteristic, to a degree, of milling all over the country, was found nowhere else to so great an extent. This development required large supplies of capital to finance it, and an attempt has been made to indicate its sources. The mills required extensive markets and raw materials from a wide area. Hence the millers pushed the building of railroads eastward to the consuming centers and westward into the wheat-fields. The wheat of the Northwest came to Minneapolis only because the millers organized a system of grain marketing which came to be centered in the Minneapolis Chamber of Commerce.

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[1] Atwater, *History of the City of Minneapolis*, 329-30.

[2] *Northwestern Miller*, May 7, 1886, p. 448. Editorial, 'Minneapolis Millers' Railroad,' gives an account of the Minneapolis and Pacific Railroad (the western extension of the Soo Line), saying that it was built because the Minneapolis millers were alarmed at the building of a line from St. Cloud to Hinckley by the Manitoba Company (Great Northern Railroad). 'It was feared that this improvement would divert a large portion of the wheat from the Manitoba lines to Lake Superior, instead of bringing it to Minneapolis to be milled.'

CHAPTER V

THE GROWTH OF THE MILLING INDUSTRY AFTER 1890 — THE MINNEAPOLIS DISTRICT

THERE were no revolutionary changes in the technique of milling after 1890. In consequence, the principal changes in the industry from then on are mainly the result of market developments, changes in sources of raw materials and changes in the organization of the industry. Transportation rates become a more decisive factor in determining the rise and fall of milling centers. Foreign markets play a larger and larger part in the strategy of the leaders of the industry. Large-scale production and combination in the baking industry exercise considerable influence on flour-milling. To the two great milling regions which we have so far dealt with — the soft winter-wheat area with its principal center at St. Louis and the hard spring-wheat area in which Minneapolis held supremacy — there are now added two new wheat regions and milling areas: the hard winter-wheat area of the Southwest and the mixed-wheat region of the Pacific Coast. The rise and fall of milling centers in this period will be considered in the next three chapters leaving for Chapter VIII a summary of the technological changes.

I. THE INTERIOR MILLS

In the Northwestern States the years since 1890 have witnessed a continuation of the westward shift of wheat-growing and flour-milling. In Wisconsin, the easternmost State of the group, the growth of the dairy industry has put an end to commercial wheat-growing, except as an incidental crop in a rotation. Flour-milling has also declined in importance, the wheat-flour output in 1925 being less than half that of 1909.[1] In part this has been the result of a growth in rye-milling, so that the State is now the leader in that field. But in the main, Wisconsin has lost its former importance in milling. In Milwaukee the industry has almost completely disappeared.

Meanwhile the western end of the spring-wheat area has seen a considerable development of commercial milling: in North and South Dakota in the decade of the nineties and, after 1900, in Montana as well. In North Dakota there had been some small mills grinding for a local market as early as the seventies. In 1877 the mills of the Red River Valley[2] shipped 17,830 barrels of flour and over a hundred carloads of grain.[3] In the following decade specialized wheat-growing became the rule and about 1890 the 'bonanza' farm was developed.[4] At that time the greater part of the State was still given over to open range and cattle-ranch, but in 1891 and 1895 'bumper' wheat crops brought North Dakota into the front rank of wheat-producing States.[5] Many of the small mills which had arisen in the western and central part of the State now developed into the commercial-milling class. At the same time there was a concentration of ownership also. Most notable of the larger companies developed at this time was the Russell-Miller Milling Company organized in 1897 and owning a number of mills in North Dakota and Montana.[6] In part the growth of milling in North Dakota

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[1] Wheat flour production (in barrels):

	1909	1914	1919	1921	1923	1925
Wis.	3,468,815	3,030,863	2,796,476	1,684,120	1,562,131	1,591,000
Minn.	22,771,362	27,117,914	28,493,454	23,725,796	23,675,229	22,631,000
N.D.	1,823,146	2,163,938	2,215,675	1,992,138	2,657,974	1,698,000
S.D.	965,970	919,443	625,355	351,728	331,529	332,000
Mont.	375,440	870,065	1,263,457	1,274,401	1,935,300	1,965,000

(*U.S. Census of Manufactures.*)

[2] In both Minnesota and North Dakota.

[3] Coulter, 'Industrial History of the Red River Valley of the North,' North Dakota State Historical Society, *Collections*, III, 566.

[4] *Ibid.*

[5] Fish and Black, *A Brief History of North Dakota*, 155–62.

[6] *Moody's Manual, Industrials* (1920), 1523; *Northwestern Miller*, April 13, 1910, p. 686. In 1910 the company operated mills at Dickinson,

was caused by a State-wide sentiment to the effect that the wheat-growers of North Dakota were being exploited by the terminal millers and that there was an economic waste involved in shipping the wheat to Minneapolis to be ground and bringing back the flour and feed. To this sentiment was due the (later) building of the State Mill at Grand Forks.

In Montana there were small custom mills in the mining sections of the State as early as 1869.[1] The growth of commercial milling, however, awaited the rise of wheat-growing in the eastern half of the State, which did not begin until after 1900.[2] In Fergus County the first elevator was built in 1904 and in much of eastern Montana there was little wheat-growing before the building of the Chicago, Milwaukee and Puget Sound Railway in 1909. The Montana Flour Mills Company began operations at Harlowton in 1911, subsequently building a large mill at Lewiston, its present headquarters. Other companies developed important mills at Great Falls, Bozeman, and other cities.[3] In the main, however, the growth of milling has not kept pace with the advance of wheat-growing. Most of the mills are small and have only a local trade. As a result there has been a conflict between the Minnesota mills and those of Puget Sound for the control of the Montana wheat, which we shall consider in another connection.[4]

Of all the Northwestern mills those of Minnesota, as one might expect, showed the greatest growth. This was true

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Grand Forks, Jamestown, Mandan, Minot, Valley City, Beach, and Bismarck, North Dakota, and at Billings, Montana. A number of these mills have since been given up.

[1] Fogarty, *The Story of Montana*, 215–16.

[2] The Washburn-Crosby Company through a subsidiary, the Royal Milling Company, built a mill at Great Falls, Montana, in 1892, and another at Kalispell in 1901. In both cases the market for flour rather than the supplies of wheat was the determining factor. At Great Falls the first years, the only local wheat supplies were those raised on the company's own lands, the bulk of the wheat being brought in from North Dakota. (Edgar, *The Medal of Gold*, 285.)

[3] *Northwestern Miller*, March 30, 1927, p. 1285.

[4] See below, p. 209 ff.

not merely of the metropolis, but of the interior mills as well. During the two decades (1870–90) when the Minneapolis millers were introducing the 'New Process,' they outdistanced their country competitors, but thereafter the interior mills held their own fairly well. Many of the smaller mills were forced out of business, but others adopted the new machinery and the new methods of milling, enlarged their scale of production, and so kept pace with the Minneapolis mills. As a result every census after 1870 has shown, for the interior mills, an increase in capital invested, cost of raw materials and value of product. A number of minor centers have been developed in each of which there are a number of mills which compare favorably in construction, equipment and volume, and quality of output with the best Minneapolis mills.[1] There has been a concentration of ownership as well, there being some six or seven firms or corporations each of which owns mills in two or more towns.[2] At least two of these have expanded into other areas, thereby attaining a position which justifies special mention of them. They are the International Milling Company and the Commander group.

The International Milling Company began with a mill at New Prague, Minnesota, which was gradually enlarged to a daily capacity of 2800 barrels. Meanwhile the owners,

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[1] Milling centers of the spring-wheat area — (daily capacity in bbls.):

Illinois	
Chicago	7,000
Wisconsin	
LaCrosse	4,500
Superior	5,600
North Dakota	
Grand Forks	4,800
Montana	
Great Falls	4,075
Minnesota	
Faribault	2,550
Hastings	3,250
Mankato	2,800
Minneapolis	80,990
Montgomery	3,000
New Prague	2,300
New Ulm	5,810
Red Wing	2,500
Sleepy Eye	2,000
St. Paul	4,900
Winona	4,000

(*Millers' Almanack* (1927), 127.)

[2] Such as the King Midas Mill Company, with mills at Hastings, Shakopee, and Minneapolis, and the Everett-Aughenbaugh Company, whose mills are at Waseca, New Richland, and Minneapolis.

through subsidiary corporations, have built or purchased additional mills at Wells and Blue Earth, Minnesota, and at Sioux City and Davenport, Iowa. Through milling-in-transit rates to these Iowa mills the International can tap the stream of hard winter wheat flowing out from the Kansas area and manufacture it into flour for the Eastern market. At the same time, through another subsidiary — the Robin Hood mills — they are operating in Western Canada at Moose Jaw and Calgary and are reported to be building a new mill at Saskatoon. Lastly, they are building a mill at Buffalo, so that they may compete with the large Minneapolis companies and the Eastern Canadian mills for the export trade to Europe.[1]

The Commander group is still larger but somewhat more loosely organized. Beginning with the mills at Montgomery and Morristown, Minnesota, Mr. B. B. Sheffield and his associates gradually acquired a considerable milling capacity in the Minneapolis district.[2] Then, in the spring of 1926, they purchased control of the Larabee Flour Mills Company operating five mills in the Kansas area and, shortly after, the J. C. Lysle mill at Kansas City. Closely associated with the Sheffield group is the W. J. Jennison Company with mills at Appleton, Minnesota. In May, 1927, this company purchased control of the Zenith mill from the oldest of the Kansas City milling companies. All of these properties (except perhaps the last-mentioned) have been brought under unified control through the formation of a holding company known as the Commander-Larabee Corporation, which has a combined capacity of 26,800 barrels, and ranks with Washburn-Crosby, the Standard, and Pillsbury, among the largest of American milling companies.[3]

In recent years many of the interior mills have established headquarters in Minneapolis.[4] In some cases the principal owners have become residents of the metropolis; in others the office serves as a convenient base of operations for financial management, the buying of wheat, and the sale of flour. Purely personal reasons may cause the owners of these mills to move, such as the desire to secure the cultural advantages of a large city for themselves and their families. More important, perhaps, is the fact that, while some of these mills have lines of elevators in the best wheat-growing areas, in the main they make their wheat purchases in the Minneapolis Chamber of Commerce. Most important is the fact that Minneapolis is the principal flour market of the country where the miller can best judge market tendencies and conditions and secure market information. There he can best sell his flour.[1]

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[1] *Northwestern Miller*, January 19, 1927, p. 255.

[2] *Ibid.*, February 17, 1923, p. 253.

[3] *Ibid.*, March 17, 1926, p. 1066.

[4] A recent issue of *The Northwestern Miller* contains the advertisements of no less than seventeen such companies.

These interior mills are quite independent of the large Minneapolis companies. The mills of the two groups compete actively both in the local and the larger national markets. While there have been rumors of purchases of interior mills by Minneapolis companies, which have not materialized, the interior mills have invaded the metropolis again and again. The Everett-Aughenbaugh Company (Waseca), the King Midas Mill Company (Hastings), and the Minneapolis Mill Company (Commander group) are all cases of interior milling companies purchasing or leasing mills in Minneapolis.

Certain advantages are claimed for these interior mills as against those of the metropolis. (*a*) They claim that they can buy wheat directly from the farmers, getting a better quality at lower prices than the city millers can secure at the exchange. Obviously this is important only for the very small mills. The larger interior mills must buy most of their wheat at the grain exchange. While the price may be somewhat higher, they probably secure a better selection of wheat. (*b*) The interior mill is said to have an advantage in its monopoly of a local market. But, again, it may be pointed out that the home-town market is of minor importance to a 2000- or 3000-barrel mill. (*c*) Undoubtedly the interior mill has an advantage in a lighter burden of fixed charges and perhaps in other costs. Land values and construction costs are lower in the small town. The mills usually run on a twelve-hour shift, whereas the eight-hour day is the rule in Minneapolis. (*d*) Labor conditions are generally more satisfactory to the employer in the small town where there are no trade unions. (*e*) The country miller claims to have some advantages in shipping facilities. He sometimes finds it easy to get cars and switching service when terminals at the metropolis are badly congested. (*f*) Lastly, the mills in Southern Minnesota are nearer to the sources of supply of the hard winter wheats and may find it easier to secure these for blending purposes.[1]

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[1] Based on conversations with the owner of two interior mills, with headquarters in Minneapolis.

The mills to the west and north of Minneapolis are mainly small ones with local wheat supplies and a local market. When the wheat crops in their neighborhood are good they flourish. When crops are bad they shut down. In general they do not play an important part in the nation's chief markets.

II. Growth of Milling at Duluth-Superior: Rivalry with Minneapolis

After Minneapolis gained leadership in the spring-wheat area its supremacy was undisputed except for one brief period. That was the time when Duluth and Superior [2] boasted

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[1] The discussion above is based mainly on conversations with owners of interior mills. As to the last point, it is said that in 1919 when there was a short crop of spring wheat some of the southern Minnesota mills used as high as seventy per cent of winter wheat in their milling mixture. That was, of course, an abnormal situation.

[2] Flour output of the Duluth-Superior mills (in bbls., crop year ending August 31st):

1891–1892	872,665	1899–1900	749,155
1892–1893	1,607,620	1900–1901	477,615
1893–1894	2,671,885	1901–1902	1,605,945
1894–1895	3,325,025	1902–1903	1,423,365
1895–1896	3,404,500	1922–1923	1,074,075
1896–1897	2,630,380	1923–1924	943,965
1897–1898	2,133,120	1924–1925	991,710
1898–1899	2,637,015	1925–1926	961,830

(*Millers' Almanack* (1923), 204; (1927), 142.)

that 1892 would long be remembered as the year in which they had 'toppled over the framework of preëminence built by Minneapolis.'[1]

In the early days Minneapolis millers had been anxious to build up Duluth and Superior, or at least the Lake Superior route to the East. Thus they would have a competitive route which they could use in beating down the rates eastward via Chicago. In 1876, for example, it was reported that 'The millers of Chicago and vicinity are disgusted by reports that managers of the eastern railroad pool have privily agreed with the millers of Minnesota and Wisconsin to carry their flour to New York for ten cents less a barrel than they will carry for the Chicago millers. This shows the benefits of competition. The northwestern millers have the Grand Haven and Duluth routes which are not in the pool. For the Chicago millers there is no competing route.'[2]

After a time this attitude changed. When the Minneapolis millers began to buy wheat in the Red River Valley, they met competition from European and Eastern buyers shipping via Duluth-Superior. In order to meet this competition, they tried to get a milling-in-transit rate from this territory through Minneapolis to Duluth and also a lowering of the rates through Milwaukee and Chicago to the East, so as to make them equal to the rate via Lake Superior.[3]

The main reason, however, for Minneapolis' change of attitude was the fact that there had grown up at the head of Lake Superior a group of flour-mills which seemed likely to challenge the supremacy of the older milling center. The first of these mills was built about 1885.[4] By 1895 the Duluth-Superior output exceeded three million barrels.[5] The main growth was on the Wisconsin side, where six mills were erected within a period of eighteen months (1891–92).[1]

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[1] *United States Miller*, September, 1892, p. 210.

[2] *Northwestern Miller*, January 7, 1876.

[3] *The American Miller*, XIV, 318.

[4] Minneapolis Civic and Commerce Association, *Rail-Lake-Rail Rates*, 13.

[5] Roughly equal to a third of the Minneapolis output.

The advantages claimed for the Twin Ports were: (*a*) that they were nearer to the best wheat-growing lands and better able to draw the choicest wheats of the Dakotas to their market; (*b*) that their mills were newer and more efficient, thus being able to produce a better flour at a lower cost; (*c*) that Minneapolis' advantage in water-power was neutralized by the cheap coal available at Duluth; and (*d*) that Duluth had lower rates to Eastern markets.[2]

This last was regarded as decisive. Duluth had a rate to Buffalo that was six cents lower than the rate from Minneapolis. Since wheat rates from the Red River Valley were about equal, that left Duluth with a net advantage of six cents per barrel. Apparently the Minneapolis millers recognized this situation, as they now once more demanded (1893) an equalization of rates. The differential in favor of Duluth-Superior, if allowed to stand, would wipe out 'the whole of the meager profit of ten cents a barrel that Minneapolis millers are now making.'[3] C. A. Pillsbury was quoted as saying that if these rates were allowed to stand 'the milling interests in Minneapolis will be utterly destroyed. Not only must the Minneapolis mills go out of business, but all the mills in southern Minnesota and all in Milwaukee as well.' Under such conditions Duluth-Superior would soon 'have a milling capacity greater than Minneapolis has to-day. The mills of Minneapolis have made the wheat market here. This market will go to the dogs too, and every elevator in the city as well.'[4]

The Interstate Commerce Commission seems to have refused the Minneapolis request on the ground that Duluth was entitled to the advantages of her geographic position. The lugubrious predictions of the Minneapolis millers were not fulfilled, however. While Minneapolis flour output continued to increase rapidly in the ten years after 1893, that of Duluth fell off sharply. The causes are somewhat obscure, but apparently Duluth had overestimated its advantages. As the center of the wheat area moved beyond the Red River, distances to the rival centers were equalized. The Minneapolis advantage in water-power was doubtless underestimated. The advantage in rates to Eastern markets may have been nullified by secret rebates.[1]

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[1] *Milling*, II, 1–16. While the chief mills were on the Wisconsin side the grain elevators, the exchange and the trade generally were located in Duluth.

[2] *United States Miller*, September, 1892, p. 210.

[3] *Milling*, I, 236–37.

[4] *The Roller Mill*, July, 1892, p. 17.

The big drop in output in 1899 was doubtless due to the activities of the flour-mill 'trust.'[2] It secured control of a number of Superior mills, and when it shortly got into financial difficulties these mills were closed down. For a time only one mill operated at the head of the lakes and the Minneapolis millers were accused of price-cutting in an attempt to drive it out of business.[3] Then the Imperial mill was converted to the manufacture of sandpaper and the Grand Republic, the Freeman and the Minkota were destroyed by a fire in 1907 and never rebuilt.[4] As a result only two mills remain — both belonging to the Duluth-Superior Milling Company, which is a subsidiary of the Standard Milling Company. Though production once more passed a million barrels in 1901–02, it has never gone very far beyond that point. Fundamentally the geographic advantages favor Minneapolis rather than Duluth. Six sevenths of the agricultural products of the State, as was shown in 1913, are produced in territory nearer on a railroad mileage basis to Minneapolis than to Duluth.[5] Further, Duluth is handicapped by the fact that her immediate hinterland is agriculturally unproductive and the larger area limited by the Canadian boundary. Had the removal of the tariff on Canadian wheat provided for in the Underwood Tariff and made operative by the removal of Canadian duties on flour in 1919 [1] come at an earlier period before milling was well established in the Canadian Northwest, and had the free-wheat policy been long-continued, Duluth might have seen a great revival as a milling center. For then the area from which it could have drawn its wheat supplies would have been incomparably greater. But with circumstances as they are there seems no reason to expect that Duluth and Superior will again play more than a minor part in the milling industry.

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[1] *The Modern Miller*, August 18, 1900; *The Roller Mill*, September, 1902.

[2] See below, p. 168.

[3] *The Modern Miller*, January 26, 1901, p. 16.

[4] *Northwestern Miller*, November 13, 1907, p. 405.

[5] Minneapolis Civic and Commerce Association, *Rail-Lake-Rail Rates* 15.

III. Growth of the Minneapolis Mills after 1890

In an earlier chapter the consolidation of the Minneapolis milling firms was outlined to the year 1891. By that date seven eighths of the city's milling capacity was owned by the four great corporations whose rise we had traced. The process of consolidation did not end at that date, however. In 1893 the Washburn-Crosby Company secured a lease of the Minneapolis mill [2] and in 1899 the Humboldt [3] as well. At the latter date there were only three independent mills with a combined capacity of twenty-two hundred barrels as against a capacity for the four corporations of seventy-two thousand barrels per day.[4] The decade had been a prosperous one for the Minneapolis mills, their capacity being more than doubled.[5] As a result there was a renewal of mill-building and a new group of independents entered the field. In 1900 the Christian interests, forced out of the Northwestern Consolidated by its sale to the 'trust,'[6] built the Century mill of twenty-five hundred barrels capacity. In 1907 the Russell-Miller Company, owners of a group of mills in North Dakota, built a large mill at Minneapolis to which a second mill was added later, giving them a capacity of sixty-eight hundred barrels.[1] In 1907 the Nokomis durum mill of three thousand barrels' capacity — now operated by the Minneapolis Milling Company of the Commander group — was put in operation and in 1917 the Atkinson mill, with a capacity of fourteen hundred and fifty barrels. Then in 1922 the new twenty-four-hundred-barrel mill of the United States Cereal Company was completed. All of these mills were outside of the old milling district and used steam-power, the supply of sites and water-power being exhausted at the Falls of St. Anthony. Meantime, a number of the older mills had been considerably enlarged so that between 1891 and 1900 the city's flour output was more than doubled.[2]

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[1] *Millers' Almanack* (1921), 61–62, Tariff Relations with Canada.

[2] Later purchased by them. *Northwestern Miller*, December 23, 1898, p. 1083.

[3] *Ibid.*, May 3, 1899, p. 833.

[4] Minneapolis Chamber of Commerce, *Annual Report* (1899), 126.

[5] For statistics of Minneapolis flour output during this period, see p. 166, n. 2.

[6] See below, p. 169.

While the decade 1890–1900 was thus a rather prosperous one, it would seem that the great companies were all having

[1] For the Russell-Miller Company, see above, p. 156. The mill included a blending plant where the flours from the Dakota plants were mixed to obtain a uniform quality.

[2] Minneapolis flour output (in barrels, by crop years):

1890–1891	7,434,000	1908–1909	13,697,000
1891–1892	9,500,000	1909–1910	16,075,000
1892–1893	9,349,000	1910–1911	15,813,000
1893–1894	9,321,000	1911–1912	15,708,000
1894–1895	9,428,000	1912–1913	18,230,000
1895–1896	12,577,000	1913–1914	18,146,000
1896–1897	13,473,000	1914–1915	16,182,000
1897–1898	13,299,000	1915–1916	20,443,000
1898–1899	15,318,000	1916–1917	16,235,000
1899–1900	15,308,000	1917–1918	15,255,000
1900–1901	14,863,000	1918–1919	16,543,000
1901–1902	15,802,000	1919–1920	17,117,000
1902–1903	16,505,000	1920–1921	14,524,000
1903–1904	14,213,000	1921–1922	14,785,000
1904–1905	12,747,000	1922–1923	15,730,000
1905–1906	15,141,000	1923–1924	12,191,000
1906–1907	14,159,000	1924–1925	10,969,000
1907–1908	13,137,000	1925–1926	12,509,000

(*Millers' Almanack* (1923), 203; *ibid.* (1927), 141.)

difficulties. The Northwestern Consolidated, organized, as has been shown, in 1891, had tried to sell its securities in the local market and had failed to secure sufficient working capital. There was, moreover, a division of authority in the management which did not work well in practice, and, lastly, the company had paid inflated prices for its properties so that it had too heavy a burden of fixed charges.[1] For a time it managed to secure sufficient credit from the local banks to carry on, but in 1895 was forced to reorganize. The property was leased to a new operating company which was to apply earnings, first of all, to a reduction of floating indebtedness, and, secondly, to dividends. The operating company seems to have been successful in its management, the floating indebtedness being rapidly reduced, but for several years there were no dividends. The value of the stocks therefore declined, and the operating management were later accused of taking advantage of this situation to purchase large blocks of stock at low prices.[2] Whether this was true or not there can be no doubt that there was a good deal of dissatisfaction among the stockholders.

At this juncture (1898) there came the proposal to form a monopolistic combination of all the leading spring-wheat mills. The author of the plan was Thomas McIntyre, a New York flour dealer who, in 1892, had successfully promoted a combination of the New York City mills under the name of the Hecker-Jones-Jewell Company.[3] His success in this plan led to the larger proposal of a combination of the large mills including the Hecker-Jones-Jewell Company and the mills at Buffalo, Milwaukee, Duluth-Superior, and Minneapolis. In testimony before the United States Industrial Commission, McIntyre claimed the following advantages for such a combination:[4] (*a*) the concentration of the manufacture of export flour at the port mills where it could be produced most cheaply; (*b*) the saving in cross-freights; (*c*) the concentration of production in the regions where wheat was cheapest; (*d*) a saving in selling expense; and (*e*) better superintendence. He denied that there was any idea of limiting production or raising prices. The larger profits were to be obtained by cutting down costs.

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[1] See above, p. 137.

[2] *Northwestern Miller*, June 28, 1899, pp. 1227–28.

[3] *Ibid.*

[4] United States Industrial Commission, *Report*, XIII, 681.

The necessary capital was so great as to preclude outright purchase of the mills. Any combination must necessarily include the millers themselves, especially the Minneapolis millers. McIntyre submitted the proposal to them in December, 1898, but public opposition caused them to reject the plan.[1] At Milwaukee and at Duluth-Superior, McIntyre was more fortunate, several mills agreeing to enter the combination. In February, 1899, the new combination (known as the United States Flour Milling Company) issued its prospectus and invited stock subscriptions. It was to be capitalized at $40,000,000 and was to acquire the properties of the Hecker-Jones-Jewell Company of New York, the Pillsbury-Washburn, the Washburn-Crosby, the Northwestern Consolidated, and the Minneapolis Flour Manufacturing Company properties in Minneapolis and nine mills at Milwaukee and Duluth-Superior — in all, thirty-one mills with a combined capacity of 96,150 barrels. It was claimed that the various companies were earning a total of $1,600,000 annually under the old management and that additional earnings due to the economies of combination would amount to $1,510,000.[2] The combination, it was stated, would control eighty per cent of the spring-wheat milling capacity, and, while this was probably somewhat exaggerated, there was undoubtedly a real possibility of a monopoly, since, as we have shown, there was a market for spring-wheat flours which was quite distinct and independent of that of the winter-wheat flours.

Having failed to capture the Minneapolis companies *en masse*, McIntyre laid separate siege to them. In May, 1899, he acquired control of the Minneapolis Flour Manufacturing Company.[1] For a time it had seemed as if the Washburn-Crosby and the Pillsbury-Washburn properties would be acquired also. The Washburn-Crosby Company was a mere lessee and the owners — the heirs of Governor Washburn — were anxious to sell. In April, 1899, the lessee company succeeded in purchasing the properties which put them out of the reach of the 'trust,' since W. H. Dunwoody, the leading spirit in the Washburn-Crosby Company, was bitterly opposed to the combination.[2] In the same way, it seemed for a time that the Pillsbury-Washburn Company would be easily acquired, as many of the English stockholders were dissatisfied because of the failure to pay large dividends. In this case the opposition of the Pillsbury family prevented the sale. It is said they made large purchases of securities of the company in England in order to prevent their falling into the hands of the combination.[3]

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[1] *Northwestern Miller*, December 23, 1898, p. 1083.

[2] *Ibid.*, February 15, 1899, p. 292. The capitalization was to consist of

With the acquisition of these companies removed from the list of possibilities, the slight chance of establishing a spring-wheat flour monopoly disappeared completely. After that there was really no purpose in forming a combination except that of securing the profits of promotion. However, if even one of the larger Minneapolis companies could be acquired, its prestige, it was thought, would help make the stocks of the new company attractive to the investor.[4] Hence renewed efforts were made to acquire the Northwestern Consolidated Mills. The operators were won over and the purchase accomplished in July, 1899, the Northwestern Consolidated thus becoming a subsidiary of the United States Flour Milling Company.[5]

The news of the sale occasioned a great outcry in Minneapolis and the Northwest. The Attorney-General of the

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$12,500,000 preferred stock, $12,500,000 common stock, and $15,000,000 bonds. The company, as actually organized, claimed a combined capacity of 39,000 barrels. (*Ibid.*, May 31, 1899, p. 1027.)

[1] *Northwestern Miller*, May 3, 1899, p. 833.

[2] *Ibid.*, April 12, 1899, p. 687.

[3] *Ibid.*, December 13, 1899, p. 1147.

[4] *Ibid.*, June 28, 1899, p. 1227.

[5] *Ibid.*, July 5, 1899, p. 17.

State was urged to take legal action to prevent the transfer of the mills to the 'trust.'[1] There seems to have been a fear that the success of the combination might mean the closing of some of the Minneapolis mills and ultimately the end of the city's milling leadership. As a matter of fact Minneapolis had little to fear. Its advantages as a milling center were so great that not many of its mills were likely to be dismantled and closed. It is probable that had the 'trust' succeeded in carrying out its plans, opposition mills would have been built just as the Christian interests, having been forced out of the Northwestern Consolidated, built the Century mill.[2] The future of Minneapolis milling was secure for at least another generation.

The United States Flour Milling Company had but a brief and unsuccessful career. Of the projected $40,000,000 of securities, only about $16,000,000 were sold and the company was soon in financial straits for lack of sufficient working capital. In February, 1900, it was forced into a receivership.[3] Its failure was received with expressions of joy throughout the country,[4] for it was assumed that the combination would be broken up. Such was not the case, however. The company was reorganized as the Standard Milling Company, under which name it operates at the present day. The Minneapolis mills were combined under the Northwestern Consolidated as a subsidiary to the Standard. Able and efficient financiers took control. Old and inefficient mills were dismantled, others gradually improved. By 1903 the Standard was in position to pay dividends on its preferred stock and, after 1911–12, on the common as well.[5] The Standard owns outright a number of the mills at Duluth-Superior and in Minneapolis and controls through subsidiaries the Hecker-Jones-Jewell Company of New York, the Northwestern Consolidated in the Twin Cities, the Duluth-Superior Milling Company, and the Southwestern Milling Company of Kansas City.[1] The Standard now ranks next to the Washburn-Crosby Company in the size and the widespread extent of its operations.

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[1] *Northwestern Miller*, July 19, 1899, p. 117.

[2] *Ibid.*, January 10, 1900, p. 65.

[3] *Ibid.*, January 31, 1900, p. 223; February 7, 1900, p. 272; February 26, 1900, p. 409.

[4] *Public Opinion*, March 8, 1900, contains extracts from newspapers on the subject.

[5] *Moody's Manual: Industrials* (1914), 989.

The idea of a milling trust is probably settled for a long time to come. The growth and spread of large, efficient interior mills would make it practically impossible to secure an effective monopoly of the spring-wheat mills. Nor would this be a profitable achievement, if accomplished, since spring-wheat flour no longer holds the distinctive position it had a generation ago. Combinations of the smaller mills are still possible. But since no advantages can be claimed for larger combinations than those now existing, it is not likely that we shall see a further concentration of ownership in Minneapolis. The net result of the trust movement, so far as Minneapolis was concerned, was to reduce the four great milling corporations to three by combining the Northwestern Consolidated and the Minneapolis Flour Manufacturing Company. These three dominate the field to-day.

One other important change should be discussed in this connection: the failure and reorganization of the Pillsbury-Washburn Company in 1908. That company had been financially unsuccessful, having paid dividends on its common stock in only two years out of the first eight.[2] After 1900 large sums were lost in wheat speculation and the losses apparently concealed from the stockholders. To retrieve the losses, flour grades were cut and mills and elevators allowed to deteriorate. Needless to say, such a short-sighted policy could not be long successful. Matters came to a head in August, 1908, when the banks of the city, alarmed at the company's failure to 'clean up' on its loans, refused further extensions of credit, thus forcing a receivership.[3]

[1] *Moody's Manual: Industrials* (1919), 719–20.

[2] *The Roller Mill*, January, 1899, p. 372.

[3] *Northwestern Miller*, August 12, 1908, p. 393; August 19, 1908, p. 453; August 26, 1908, p. 515.

While the receivers operated the properties, plans of reorganization were discussed. The English stockholders found it impossible to secure the necessary capital to put the company on its feet and consequently were forced to accept a plan offered by the Pillsburys and A. C. Loring, one of the receivers. This involved the incorporation of an operating company known as the Pillsbury Flour Mills Company, which took over the properties on a twenty-year lease (1909) with a minimum rental and a division of profits.[1]

The new company soon put the properties on a paying basis. In 1916 the capacity of the mills was increased by the building of the A–South mill and the purchase of the Phœnix mill, which additions were financed by the operating company. The old company was unable to pay dividends on its heavy capitalization, and when, in 1923, they were faced with the alternative of buying out the operating company or selling to it, they were forced to sell. A new holding company was then organized to absorb the two old companies. *The Northwestern Miller* then joyfully announced that these great properties were once more 'completely American.'[2] While this was not quite accurate, there seems to be no question that the native Minneapolis interests — and especially the Pillsbury family — are once more dominant in it.

The years from 1909 to 1920 saw the Minneapolis mills at their height. During those years their output averaged over sixteen million barrels of flour annually and in 1915–16, their best year, they turned out over twenty million barrels, which was roughly a sixth of the entire American output. After 1920 production began to decline greatly due to a number of causes, most prominent of which (if not most important) was a series of railroad rate changes unfavorable to the city.

The general trend of the evidence seems to show that for a long time — certainly from 1880 to 1900 — the Minneapolis millers were aided in building up their business by special favors from the railroads. They were given secret rebates at

[1] *Moody's Manual: Industrials* (1923), 1481.

[2] *Northwestern Miller*, July 4, 1923, p. 40.

times,[1] but mainly they were benefited by schedules of rates which, their opponents claimed, were unduly favorable. This structure of favorable rates is gradually being destroyed by decisions of the Interstate Commerce Commission, which hold that rates which might have been justified in the days of active river traffic are no longer justified when river competition no longer exists.

Perhaps the first of these decisions was the one recorded in 1907–08 in the case of the Banner Milling Company of Buffalo against the New York Central Railway,[2] in which the Commission prevented an attempt to lower the Minneapolis rate to Hudson River and New England territory because the Buffalo rate to that territory was not lowered correspondingly. Various other rate cases resulted badly for the city, the climax coming in 1920 when the Commission approved of a series of rate changes which took away practically all milling-in-transit privileges from the Minneapolis mills. The Director-General of Railroads had asked the Commission's opinion with regard to certain rate changes. The Commission approved of them. They may be summarized as follows:

(1) They took away from Minneapolis, with a single exception, all the milling-in-transit privileges which it had enjoyed in the wheat of practically the whole of the Northwest, leaving it to such competing centers as Milwaukee, Chicago, and Kansas City. The Commission disapproved of these rates mainly because of the out-of-line hauls they involved. They insisted that 'when practicable, rates through important grain markets should break into definitely known inbound and outbound components. Such an adjustment is

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[1] *Modern Miller*, August, 1900, p. 16. Similar accusations may be found in *The Northwestern Miller*, January 7, 1876; October 12, 1877; January 25, 1878; February 22, 1878; July 19, 1878; August 30, 1878; *The American Miller*, XI, 491 (1883); XIV, 318 (1886); Interstate Commerce Commission, *Reports* (1898), 6; (1897), 33–34; (1899), 26; and *The Roller Mill*, September, 1902.

[2] Interstate Commerce Commission, *Reports*, XIII, 31 ff., and XIV, 398 ff.

preferable to transit under a through rate.'[1] Only on grain from Omaha and Sioux City bound for Duluth could transit be retained.

(2) It denied the application of Duluth for lake-and-rail rates to Buffalo equal to those from Chicago. The Commission held that both Duluth and Chicago were intermediate points between Minneapolis and Buffalo, and hence the rate from Minneapolis to Buffalo should be the same through either city. Since the rate from Minneapolis to Duluth was five and a half cents *less* than from Minneapolis to Chicago, the rate from Duluth to Buffalo had to be five and a half cents *more* than the rate from Chicago to Buffalo. True, the distances were unequal, but the Commission felt this was necessary in order to protect the mills between Minneapolis and Chicago.

(3) The rail-lake-rail rates (and also all-rail) on flour and other grain products from Minneapolis to New York, which had been lower than the (domestic) wheat rate, were raised so as to be half a cent higher.

The millers and grain men of Minneapolis petitioned for a rehearing and it was granted. They felt that the decision was discriminating in taking away the milling-in-transit privilege from them, but leaving it to competing mills in southern Minnesota, Milwaukee, and Chicago.[2] However, the Commission refused to rescind its former action and the rates went into effect with slight modifications.[3]

The Minnesota Millers' Club appealed to the farmers of the Northwest in full-page newspaper advertisements to join them in protests against this decision. The railroads were accused of trying to force Northwestern grain products to take the all-rail rate through Chicago and thus to 'destroy the influence of Lake Superior as a rate-making factor' — by giving Chicago a lower rate on flour to Buffalo, though the distance was greater, and by allowing the railroads east of Buffalo to charge a higher rate for grain coming from Chicago than on grain from Duluth.[1]

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[1] Interstate Commerce Commission, *Reports*, 56 (1919): 133–46.

[2] *Minneapolis Journal*, January 20, 1920.

[3] *Northwestern Miller*, February 4, 1920, p. 526; March 3, 1920, p. 1033. Interstate Commerce Commission, *Reports*, 56 (1919): 686–89.

Not only the Minneapolis mills, but those north and west of the city as well, felt that this decision was unfair to them, particularly as milling-in-transit was retained by the southern Minnesota mills and those of Milwaukee and Chicago. In the following year they succeeded in getting the Northwestern railroads to propose the lowering of the joint proportional rates on grain and grain products to the East through Milwaukee and Chicago, but the Interstate Commerce Commission refused to allow the change.[2] In 1924 the Southwestern Millers' League appealed to the Commission for a revision of the rates to Central Freight Association territory, claiming that the Minneapolis rates were unduly favorable as compared with those from Kansas City and neighboring centers.[3] In April, 1927, the Commission upheld their contention and ordered a reduction in the rates from the Southwest to bring them more nearly on a parity with those of Minneapolis.[4]

There were, as we shall see, other causes for a decline of Minneapolis milling, but following these decisions there was something like a migration of Minneapolis milling capital to other centers. In February, 1922, the Washburn-Crosby Company announced the purchase of the Star and Crescent mill at Chicago, and soon thereafter that they would build their new cereal-products mill adjoining.[5] In the following month they purchased the partly completed Liberty mill at Kansas City and proceeded to enlarge it to a capacity of sixty-five hundred barrels.[6] In May, 1922, the Pillsbury Company purchased a mill at Atchison,[7] Kansas, and in

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[1] *Minneapolis Journal*, April 18, 1920.

[2] *Northwestern Miller*, May 31, 1922, p. 949.

[3] *Ibid.*, March 12, 1924, p. 1098.

[4] *Ibid.*, April 27, 1927, p. 359.

[5] Edgar, *Medal of Gold*, 339–41.

[6] *Minneapolis Tribune*, March 7, 1922.

[7] *Ibid.*, May 3, 1922.

September they announced plans for the building of an eight-thousand-barrel mill at Buffalo.[1] In December, 1923, the Russell-Miller Company awarded contracts for a new mill at Buffalo soon after selling their B mill at Minneapolis to one of the interior mills.[2] In April, 1924, the Pillsbury Company announced its intention of dismantling the Palisade mill and shipping the machinery to Buffalo.[3] 'Unfavorable freight rates' was the explanation given for all these moves and the further statement was made that 'the change is part of a movement to "zone" the industry. . . .'[4]

The general rise in freight rates since the Great War has, of course, had a decentralizing effect on industry in general, so that a movement to 'zone' an industry — that is, a decentralizing movement — would appear more or less inevitable. While these decisions did undoubtedly change the rate situation to the disadvantage of Minneapolis and in favor of the winter-wheat mills west of Chicago,[5] it is not to be supposed that it was the sole cause of Minneapolis' milling decline. There were other causes for the advance of the winter-wheat mills as will presently be shown.[6] The enormous growth of the Buffalo mills in recent years has been due to the transfer of the export milling business of the big Minneapolis companies to their Buffalo mills, a change growing out of conditons in the foreign market and the advantages of milling Canadian wheat-in-bond.[7] Moreover, the advance in milling technique, especially in mill architecture and planning, had rendered some of the Minneapolis mills almost obsolete. After all, the casual visitor to the Minneapolis mills is impressed with the fact that the buildings are old, the sites small and inadequate, and some of the mills, at least, badly planned and arranged. In contrast with these, the mills at Buffalo and Kansas City are large, well-arranged, new and up to date, and probably have a considerable advantage in manufacturing costs, though data on the subject are not available to show how much.

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[1] *Minneapolis Tribune*, September 27, 1922.

[2] *Northwestern Miller*, December 5, 1923, p. 997.

[3] *Minneapolis Journal*, April 3 1924. This plan was not carried out however.

[4] *Ibid.*, April 3, 1924.

[5] And also the mills in southern Minnesota, since they retained milling-in-transit privileges.

[6] See below, pp. 203–04.

[7] See below, p. 217 ff.

The rapidity and suddenness with which these developments have taken place caused serious doubts to arise as to the future of Minneapolis as a milling center. *The Northwestern Miller* has tried to keep up a brave front. It is true, it said, that many of the conditions which caused Minneapolis' overwhelming superiority have ceased to exist; e.g., (1) the Northwestern millers no longer have a monopoly of hard-wheat flour production; (2) transportation conditions have changed and relative freight rates also. But, 'conditions in flour milling are such as to defy prophecy from year to year.' Crops, transportation rate changes, the tendency of buyers to favor one type of flour or another, all change often and suddenly. Probably all that these new developments mean is that the Minneapolis millers intend to be prepared for whatever may happen. 'So long as the Minneapolis mills can secure ample supplies of hard spring wheat to grind, there is little danger that the city will lose the position it won nearly half a century ago.'[1]

In 1926 the Northwestern railroads again attempted to come to the rescue of Minneapolis. In July of that year the Interstate Commerce Commission sanctioned a reduction by the Minneapolis and St. Louis Railroad of three cents a hundred pounds on wheat from the Kansas area to be milled in transit at Minneapolis and shipped East. Under the previous arrangement the Minneapolis mills had to pay eleven cents more than the Kansas City and other Southwestern mills. This differential was now reduced to eight cents.[2] Minneapolis' disadvantage in milling hard winter wheat as compared with Kansas City and Buffalo was thus considerably decreased. Shortly thereafter the Minneapolis and St. Louis Railroad and the Soo Line announced reductions of six cents per hundred pounds on wheat from Montana, North Dakota, and Northern Minnesota to be milled at Minneapolis and shipped to points east of Buffalo and Pittsburgh.[1] The proposal was immediately attacked by the trunk-line railroads because they did not want the existing rate situation disturbed; by the Southwestern millers and grain exchanges, on the ground that Northwestern grain milled at Minneapolis already had an advantage of four and a half cents over Southwestern grain milled at Kansas City which this change would increase to ten and a half cents; and by Buffalo interests on the ground that Minneapolis was already receiving her fair share of the Northwestern grain and was not declining as a grain market.[2] The State Boards of Railroad Commissioners of North Dakota and of Montana both favored the reduction, on the ground that it would benefit the Northwestern farmers in giving them higher prices on their wheat and lower prices on mill-feeds.[3]

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[1] *Northwestern Miller*, May 10, 1922, p. 598.

[2] *Ibid.*, July 14, 1926, p. 132.

The Interstate Commerce Commission refused, however, to sanction this reduction. It would be unfair to do so without making a corresponding reduction to the Southwestern milling centers, which the railroads were not prepared to do. Minneapolis had based its demand on the proposition that lake rates had given an unfair advantage to Buffalo, so that the former city was no longer getting its fair share of the Northwestern wheat. But the growth of Buffalo and the corresponding decline of Minneapolis had been mainly caused by the transfer of the export milling by the big Minneapolis companies to their Buffalo mills. This was due to the fact that Buffalo had such great advantages for milling Canadian wheat-in-bond. The rate cut under consideration could not remedy that situation. So far as their domestic trade was concerned, there was no such decline in the business of the Minneapolis mills as to indicate that they were laboring under a handicap of unfair rates.[4]

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[1] *Minneapolis Journal*, July 31, 1926, and ff.

[2] *Northwestern Miller*, August 11, 1926, p. 573

[3] *Ibid.*

[4] *Ibid.*, March 2, 1927, p. 844.

The matter of the wheat supplies of the Minneapolis mills is clearly the fundamental problem. The future of the Minneapolis mills is doubtful just because it is uncertain whether the city will continue to secure 'ample supplies of hard spring wheat to grind,' as *The Northwestern Miller* has suggested. As one of the millers expressed it (in 1922): Minneapolis mills require over four hundred thousand bushels of wheat a day when grinding to full capacity. Short crops in recent years have held the supply of wheat below this milling demand. With southern Minnesota mills also drawing on the Minneapolis supply, there has been a shortage of choice milling wheat; the price has been driven to a premium and out-of-line with the other markets. Minneapolis millers are finding it difficult to make flour out of this high-priced wheat and sell it in competition with other milling centers which can get cheaper wheat of as good quality.[1]

In part this shortage of high-grade spring wheat is due to the spread of durum-growing in the Northwest.[2] As we shall see, the millers have been very much alarmed at this, as durum is not a good bread wheat. The farmers grow it in spite of the millers' opposition and at a normally lower price because durum alone seems to resist the black-stem rust, which in 1916, in North Dakota alone, caused a loss of over 100,000,000 bushels in the wheat crop.[3] The rust attacks the winter wheats also and, in certain years, has caused much damage. But, generally speaking, winter wheat matures earlier than the rust and so escapes its ravages. The spring wheat, especially in cold and wet seasons, matures several weeks later and so catches the brunt of the rust attack. So far the efforts of the cerealists to develop an early-maturing spring wheat have not been successful, since the only varieties which have been grown successfully have secured early maturity at the sacrifice of milling quality.[1] In recent years the millers, through their 'Spring-Wheat Crop-Improvement Association,'[2] have coöperated with the Minnesota College of Agriculture in a campaign against the barberry bush which acts as host to the rust. While the results have been quite encouraging, it would be going too far to say that the danger of black-stem rust has been definitely eliminated.

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[1] *Minneapolis Tribune*, April 6, 1922.

[2] See below, p. 243 ff.

[3] Stakman, 'The Black Stem Rust and the Barberry,' *Yearbook of the Department of Agriculture* (1918), 76. The North Dakota crop was over 151,000,000 bushels in 1915 and only 39,000,000 in 1916.

Even in seasons relatively free from rust, however, wheat yields are low in the spring-wheat area as compared with the winter-wheat regions — low and declining. This is largely due to the one-crop system which has been the rule in much of the Northwest. Repeated cropping with nothing but wheat has made many fields almost unbelievably foul. This has cut down the wheat yields because of the mere matter of the space taken by the weeds. In addition, the weeds draw the moisture from the soil and help to breed rust. Then, in shipping, the farmer loses heavily in dockage.[3] Many of the weed seeds are inseparable from the wheat except at prohibitive cost, and this lowers its grade. Some of the weeds mature before the wheat and so reseed themselves. The remedy is a crop rotation which will alternate the wheat with a cultivated crop and so give an opportunity to diminish these weeds. But the spring-wheat-growers of North Dakota and Montana find it difficult to get a satisfactory rotation. They cannot rotate with corn as do the Kansas farmers, since their climate will not permit it to ripen. Potatoes have proved satisfactory from a technical standpoint, but the farmers find it difficult to market them at a profit. Various other crops might be used but for high labor costs. The only alternative is the use of a fallow system — an expensive and in some respects an unsatisfactory substitute for rotation.

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[1] Such as the new Kota wheat.

[2] *Northwestern Miller*, July 20, 1921, p. 269. See also the number of June 29th for a summary of the annual report of the Association.

[3] In 1920–21 the average dockage on all cars inspected by the Minnesota Grain Inspection Department was 4.5 per cent; in 1922 it was 3.8 per cent. In general the percentage of dockage tends to increase. (Minnesota Railroad and Warehouse Commission, *Annual Report of the Chief Inspector of Grain* (1922), 24.) The average for the years 1909–14 was 2.9 per cent; for the years 1915–20 it was 4.0 per cent. (*Northwestern Miller*, January 25, 1922, p. 372.)

The Kansas wheat-growers escape these difficulties very largely. The sowing of the wheat in the fall gives a better distribution of farm work. As we have shown, the wheat matures earlier and so is more apt to escape the rust. In the fall the Kansas farmer can pasture his cattle on the new wheat, thus cutting down his feeding costs. Corn provides a very good rotation for wheat. Conditions are more favorable for cattle-raising, hence there is more fertilizer to keep the soil in good condition. As a result their fields are kept cleaner, their yields are considerably greater, and their costs per acre lower. So far as one can see now, the tendency of the future will be to increase the winter-wheat crop in acreage and volume and to decrease the crop of spring wheat.

There are certain factors which make the Minneapolis outlook less depressing. In output the Minneapolis mills still rank first. They still are able to outsell their competitors in the domestic market — even in New England and the Middle States where the conflict is fiercest. As Washburn-Crosby, Pillsbury, and Russell-Miller transfer capital to other centers, large and powerful interior millers are glad to come in and take up the fight in their stead.[1] If the Interstate Commerce Commission justifies rate changes unfavorable to Minneapolis by pointing out that the former rates were based on water competition which no longer exists, it is always possible that Minneapolis may be able to revive the river traffic and bring water competition once more into being. Minneapolis men (but not the big millers) are enthusiastically supporting the effort to establish a barge line

[1] Thus in recent years Everett, Aughenbaugh and Company of Waseca (Minneapolis), one of the largest of the southern Minnesota firms, has taken over the B mill of the Russell-Miller Company; the Commander-Larabee Corporation has acquired the Nokomis mill and is operating it through a subsidiary, the Minneapolis Milling Company and the King Midas Mill Company operates the old Dakota mill.

with a regular service to St. Louis and the Ohio Valley. The Minneapolis mills conceivably may be able to secure through rates on wheat from western Canada, which will enable them to bring the wheat by rail direct (whereas under present conditions they must bring it down from Fort William and Port Arthur by boat to Duluth and rail the rest of the way) and so mill-in-bond in competition with the Buffalo mills.[1] The position of technical inferiority in which many of the Minneapolis mills are now placed may be reversed by the scrapping and replacement of antiquated mills. While there is little likelihood that Minneapolis will ever be able to reach the position of superiority which it has held in times past, there is no reason to think that it will not for a long period to come be in the front rank of the milling centers of the world.

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[1] Competition between Minneapolis and Buffalo is discussed more fully in the section on the Buffalo mills. See below, p. 215 ff.

CHAPTER VI

THE GROWTH OF THE MILLING INDUSTRY AFTER 1890 — WINTER-WHEAT CENTERS

I. THE GROWTH OF MILLING IN THE SOFT-WINTER-WHEAT AREA

WE have shown in a previous chapter how, by the time of the Civil War, St. Louis had become the leading flour-manufacturing center in the soft-winter-wheat area.[1] The war, cutting off the Southern market, gave the industry a set-back, but afterwards there was a steady growth.[2] By 1869 the city mills were producing a million barrels of flour and country mills tributary to the city (at Alton, Belleville, and other towns in southern Illinois) were sending in 1,200,000 more.[3] In the next decade the production of the city mills doubled, while that of the country mills also increased considerably.[4]

By 1880 the St. Louis millers were in a very strong position. There had been some concentration of ownership, at least four firms owning two or more mills. The city mill-owners were reaching out into the tributary territory, buy-

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[1] See above, p. 83ff.

[2] *American Miller*, XI, 542–43.

[3] St. Louis Merchants' Exchange, *Annual Report* (1880), 67.

[4] St. Louis flour trade, calendar years, in barrels, 1867–1924:

	RECEIPTS	MANUFACTURES	SHIPMENTS		RECEIPTS	MANUFACTURES	SHIPMENTS
1867...	944,000	765,000	1,450,000	1910...	2,678,000	969,000	2,888,000
1870...	1,491,000	1,351,000	1,790,000	1913...	3,266,000	1,036,000	3,890,000
1873...	1,296,000	1,420,000	2,506,000	1915...	3,952,000	1,678,000	4,905,000
1877...	1,157,000	1,517,000	2,295,000	1916...	4,490,000	1,750,000	5,288,000
1880...	1,703,000	2,077,000	3,292,000	1917...	3,893,000	1,619,000	5,412,000
1883...	1,585,000	1,892,000	2,751,000	1918...	2,965,000	1,398,000	3,951,000
1887...	1,049,000	1,985,000	2,594,000	1919...	4,284,000	1,798,000	5,320,000
1890...	1,229,000	1,872,000	2,880,000	1920...	4,120,000	1,441,000	4,794,000
1893...	1,171,000	1,669,000	2,044,000	1921...	5,266,000	1,505,000	6,013,000
1897...	1,329,000	1,080,000	1,618,000	1922...	4,476,000	1,518,000	6,080,000
1900...	1,869,000	1,346,000	2,535,000	1923...	4,949,000	1,758,000	6,192,000
1903...	2,340,000	1,112,000	3,127,000	1924...	5,080,000	1,275,000	6,097,000
1907...	2,855,000	1,189,000	3,201,000				

(*Millers' Almanack* (1923), 207; *ibid.* (1927), 141.)

ing or building mills there.[1] The foreign trade in flour was also well developed. Much flour was being sent down the Mississippi for export to Cuba and the West Indies.[2] The millers were selling their flour in the British markets directly, without the intervention of middlemen in the Atlantic ports. A system of flour inspection had been established and their grades were being generally accepted in foreign markets.[3]

After 1880, however, the St. Louis millers began to feel the effects of the competition of the spring-wheat mills. The spring-wheat 'patents' commanded a higher price in the New York market, where St. Louis flours had held the leading place. The St. Louis millers were at first unwilling to believe that any flour could be better than theirs. The spring 'patents' were but a passing fad; St. Louis red winter wheat 'was the best wheat grown on the American continent and made the best flour.'[4] When they found that the demand for 'patents' did not pass away, they proceeded to equip their own mills for gradual reduction by the roller process. They found, however, that the machinery and methods used for hard spring wheat were not necessarily successful with the soft winter varieties. The first St. Louis 'patent' flours were not a success, and it was only gradually that the 'New Process' was successfully applied there.[5] As a result, Minneapolis took the lead in the decade 1880–90. In 1880 the two cities were about equal; in the next ten years, while Minneapolis' production quadrupled, that of St. Louis remained stationary.

Searching for a cause of this condition, St. Louis decided that it was losing ground because of discriminating freight rates. In 1885 the shippers of the city complained to the Illinois Railroad and Warehouse Commission that they were being forced to pay thirteen cents per hundred pounds on flour from East St. Louis to Chicago, whereas Minneapolis paid only fifteen cents for a distance twice as great.[1] The Commissioners took no action, however. In the same year an appeal was made to the Central Traffic Association. St. Louis had, during this year, virtually been shut out from the trade of the East and of Europe on account of the discrimination in freight rates in favor of Minneapolis. Therefore the St. Louis millers appealed for relief, saying, 'We can only work our mills to full capacity on as cheap freight rates per mile as competing centers pay.' [2] Here again they gained no relief, but they consoled themselves with the thought that the new Interstate Commerce Act would remedy these evils and St. Louis would once more resume the place of leadership.[3] There are no more complaints of rate discriminations from St. Louis after that; in fact, it is hard to see how a city of such importance as a transportation center and with such magnificent water routes could be discriminated against very long or very seriously. But St. Louis did not resume the leadership of milling, so that there must have been other causes of decline. While their relative importance is not clear, several reasons have been alleged: (*a*) the shift of the territory north and west of St. Louis to corn-growing; [4] (*b*) a conflict between the St. Louis millers and the grain shippers, the latter wishing to relax the inspection methods, the former favoring stricter grading; [5] (*c*) the system of speculation in flour 'futures' inaugurated by the Merchants' Exchange in 1880,[6] which, it was claimed, tended to make the millers emphasize speculation rather than manufacturing; (*d*) a decline in the quality of the winter wheat due to continuous cropping and possibly to climatic changes also, but mainly because the semi-hard

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[1] *Northwestern Miller*, January 6, 1882, p. 486.

[2] *Ibid.*, February 6, 1880, p. 86.

[3] St. Louis Merchants' Exchange, *Annual Report* (1880), 65.

[4] *Ibid.* (1885), 80.

[5] *Ibid.* (1882), 76.

[1] *American Miller*, XIII, 401.

[2] St. Louis Merchants' Exchange, *Annual Report* (1886), 117.

[3] *Ibid.*

[4] *The Roller Mill*, August, 1900, p. 81.

[5] *Millers' Journal*, XIII, 1039 (October 13, 1880).

[6] *Northwestern Miller*, February 13, 1880, p. 100.

Mediterranean wheat was superseded by softer wheats such as the Fultz. These gave larger yields and were easier to grind, but did not yield a flour of as high a quality.[1]

Of these perhaps only the first and the last points are worthy of serious consideration. A writer in *The Modern Miller* in 1901 suggests certain other causes for a relative decline of soft winter-wheat milling:[2] (*a*) In the spring-wheat territory the mills are concentrated between the wheat area and the market. It is not so in the St. Louis region, since the chief wheat supplies come from Illinois and Indiana and the flour is shipped back over the same route to the Eastern market. (*b*) The writer goes on to state that the spring-wheat mills show a greater concentration of ownership so that the millers can to some degree control prices. (*c*) Having greater capital the spring-wheat millers can control lines of elevators and buy their wheat at first hand and hence buy more cheaply. (*d*) The export demand is for winter wheat, not flour. So winter-wheat millers have the competition of European buyers to face. But the European buyers purchase spring-wheat flour and not wheat to blend with their own manufacture. (*e*) The spring-wheat millers are able to get a larger percentage of 'patent' flour from a bushel of their wheat, which alone is an advantage of twenty-five cents a barrel.

The writer believed that the St. Louis winter-wheat flour was still the best flour made. The baker might prefer the spring-wheat flour because it made more loaves to the barrel, but for general family use the St. Louis flour was the better. The trouble was that the St. Louis millers could not afford to advertise it. Their mills were smaller than those of their northern rivals and their costs of manufacture higher.[3]

Probably the best explanation of St. Louis' relative decline in milling importance can be found in the changes in the wheat areas and the rise of new milling centers. In the soft-winter-wheat area, many new centers developed, the most important being Toledo, Indianapolis, Louisville, Detroit, Nashville, and Evansville, drawing their wheat supplies from the same region and with a clear advantage over St. Louis in freight rates to the Eastern markets, since they could get milling-in-transit rates, while St. Louis could not. The advantage was bound to be permanent for Toledo and Evansville because of water competition. Obviously so long as the chief supplies of the soft winter wheat come from east of the Mississippi, these newer centers are bound to have an advantage over St. Louis in the Eastern markets.

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[1] *Modern Miller*, December 29, 1900, p. 12.

[2] *Ibid.*, May 25, 1901.

[3] *Ibid.*, August 14, 1900, p. 14.

The St. Louis millers met this situation in the late nineties by turning to the milling of the hard winter wheat of Kansas. The *Annual Report* of the Merchants' Exchange for 1899 notes that part of the mills have adapted their machinery to the grinding of hard winter wheat and claims that the flour so made 'competed successfully, not only in the domestic, but in foreign markets, with the best spring-wheat brands from the Northwest.'[1] In 1903 it was stated that more hard wheat than soft was used, the price being relatively lower, thus enabling the millers better to compete with those of other sections. The flours from the two kinds of wheat were being blended, producing a somewhat inferior product, but one accepted by the trade because of the

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[1] St. Louis Merchants' Exchange, *Annual Report* (1899), 163.

Milling centers and daily capacity in the soft-winter-wheat region:

Illinois	
Alton	4900
Detroit	3500
East St. Louis	3500
Indiana	
Evansville	3100
Indianapolis	4040
Lawrenceburg	2500
Kentucky	
Louisville	5000
Michigan	
Missouri	
St. Joseph	8000
St. Louis	11,900
Springfield	2875
Ohio	
Fostoria	2675
Toledo	5500
Tennessee	
Knoxville	2730
Nashville	4150
Virginia	
Richmond	2200

(*Millers' Almanack* (1927), 127.)

lower price.[1] From then on almost every report shows an increasing use of hard wheat. But St. Louis never became distinctively a hard-wheat center. It was too far from the region of production and there were too many strong milling companies in Kansas City and Kansas by 1900. Kansas City was the geographical center and the natural market for the hard-winter-wheat region, and to that city passed the milling leadership of the Southwest. It is significant in this connection that, when the Washburn-Crosby Company first attempted to expand beyond the bounds of the spring-wheat territory, they selected St. Louis as the city in which to make the adventure. After operating the Victoria mills on a lease for a year or two they gave them up and turned to Louisville instead. In that city they have erected large mills for the manufacture of soft-winter-wheat flour for the supply of their Southern trade.

St. Louis still has five milling companies operating mills of 10,800 barrels' capacity.[2] In addition there are six firms now (or recently) operating mills in the city, which own mills with an aggregate capacity of 14,650 barrels' capacity in tributary territory. Most of these are located in southern Illinois, at Alton, Belleville, Mount Carmel, and East St. Louis, though there are some as far away as Terre Haute, Indiana, and Dallas, Texas.

In this as in other sections there has been an increasing tendency to consolidate and combine, especially with mills in other wheat regions so as to secure a variety of output. Illustrative of this tendency are the recent consolidation of the Valier and Spies Milling Company with the

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[1] St. Louis Merchants' Exchange, *Annual Report* (1903), 138.

[2] St. Louis flour-mills and capacity in barrels, 1925:

Marshall Hall Milling Co.	3000
Saxony Mills	1300
Geo. P. Plant Milling Co.	3000
Valier & Spies Milling Co.	3000
Hezel Milling Co.	500
J. F. Imbs Milling Co. (Mills at Belleville, Ill.)	1000
Valier & Spies Milling Co. (Mills at St. Jacob and Marine, Ill.)	1100
John F. Meyer & Sons Milling Co. (Mills at Springfield and Nashville, Ill.)	2450
Sparks Milling Co. (Mills at Terre Haute, Ind., and Alton, Ill.)	3000
Stanard-Tilton Milling Co. (Mills at Alton, Ill., & Dallas, Texas.)	5000
Bernet, Craft & Kauffman (Mills at Mt. Carmel, Ill.)	2100

(*Millers' Almanack* (1926), 130, 138.)

Kansas Flour Mills Company of Kansas City. The two are to be controlled by a holding company known as the Flour Mills of America, which will thus combine three mills in the soft-winter-wheat region with eight mills in the hard-winter-wheat territory and two in the spring-wheat area.[1] In the same way, the tendency toward integration, as a result of which corporations manufacturing other types of food products are being tempted to diversify their lines by dipping into flour-milling, is illustrated by the recent acquisition of the Aunt Jemima Mills of St. Joseph, manufactures of pancake and other flours, by the Quaker Oats Company, which produces not only oatmeal, but spring-wheat flour both in this country and Canada. Another example of the same thing is the acquisition of control over the Igleheart Brothers Company of Evansville, Indiana, manufacturers of Swansdown (cake) flour, by the Postum Cereal Company. Here, as in the spring-wheat region, we find the interior millers attempting to get control of milling capacity at the terminal markets, partly for blending purposes and partly for marketing reasons. An example of this is the acquisition of control of the Plant mills of St. Louis by the Kell interests operating a large group of mills in Kansas, Oklahoma, and Texas.

Of the other milling centers of the soft-winter-wheat region only brief mention can be made. St. Joseph, Missouri, is notable for its production of pancake and other special flours, though there are large mills making blends of hard and soft-winter-wheat flours for which purpose they are strategically located. Toledo, on Lake Erie, is so located as to share with Buffalo the possibility of access to both spring and winter wheats, hard and soft wheats, and Canadian wheat as well. Most notable of the Toledo mills is that of the National Milling Company, now controlled by the National Biscuit Company — the first example of this type of integration. Nashville and Louisville are not distinctively wheat-milling centers, as they both have large blending establishments in which the flour from the smaller mills of the region is blended with stronger flours from the hard-wheat area, and, in addition, they are both important corn-milling centers.

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[1] *Northwestern Miller*, April 28, 1926, p. 338; see below, p. 199.

In all of these cities we find milling companies of very large capacity, with nationally known and advertised brands, competing on equal terms with the largest companies of the other sections. Yet, taking the area as a whole, we find that, although it is the largest wheat-producing region of the country, its flour production is hardly sufficient to supply the needs of its own population. The Federal Trade Commission, commenting on this situation (1920), suggests the following reasons: 'Most mills in this area are much smaller than those in the selling areas, and their limited output, together with transportation difficulties, make it impossible for them to produce the constantly maintained and standardized quality of flour required in a commercial market. They are also at a disadvantage in that, although they have an abundant supply of soft wheat readily available, it is possible to sell only a limited quantity of soft wheat flour in competition with the hard wheat flours produced farther west, and such sales can only be made at a considerable discount below hard wheat flour prices.'[1]

The mills of the region have lost ground during and since the Great War. The smaller mills are unable to stand the competition of the big hard-wheat mills in their own territory and the larger ones seem to be losing ground in the cotton belt before the competition of the Pacific Coast millers. The decline of home baking has hit them harder than the millers of any other region, for the soft-wheat flours are 'weak' flours and the commercial baker demands 'strong' flours above all. At a recent meeting of the millers of Missouri and Illinois the following remedies were suggested: the pushing of the sales of self-rising flours; efforts to get State institutions to buy only flour milled within the State; coöperative advertising; agreements not to job hard-wheat flours nor to grind hard wheat; and 'looking closely after production costs.'[1] Efforts are being made to increase storage capacity so as to take better advantage of local wheat supplies and to secure more favorable railroad rates into the Southeastern States, which still constitute the best market.[2] We may infer that, while the smaller mills are fast disappearing, the larger ones are prospering. They do so, however, by turning more and more from wheat-flour-milling to other fields such as corn-milling, the production of self-rising flours and breakfast cereals, and the blending of their own soft-wheat flours with the product of the hard-wheat mills.

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[1] Federal Trade Commission, *Report on Commercial Wheat Flour Milling*, 27.

II. The Rise of Milling in the Hard-Winter-Wheat Area: Kansas City as a Milling Center

Since the year 1892 Kansas has led all the States in wheat production.[3] An altitude peculiarly favorable to the growth of a dry, hard wheat; a long, cool growing season, a warm, dry harvest period, an abundance of sunshine, a fertile soil — these were the factors in the State's success in wheat-growing.[4] The pioneers had made a beginning before 1860; in that year the State produced 168,527 bushels of wheat. There was little progress during the Civil War, but thereafter the area of cultivation expanded rapidly. Over two million bushels of wheat were being raised annually by 1870; by 1875 over twenty-five million, and in 1884 nearly fifty million. In the next four years there was a recession and recovery since which time Kansas' leadership has been supreme.[5]

Settlement of the State spread south and west from the Missouri border. The wheat grown was the soft red winter wheat on which St. Louis had built its milling leadership. The eastern counties continue to grow this soft wheat to this day, partly from custom and partly due to commercial and climatic conditions. The territory is tributary to mills which market their product mainly in the western part of the cotton belt where soft-wheat flour is preferred. The lands on which the soft wheats are grown lie at a lower altitude and have a heavier rainfall than the rest of the State. The hard wheats do not flourish under such conditions. It is claimed, moreover, that the soft wheats are better-yielding, more resistant to disease, and earlier in maturity.[1]

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[1] *Northwestern Miller*, December 19, 1923, p. 1198.

[2] *Ibid.*, December 24, 1924, p. 1262.

[3] Kansas State Board of Agriculture, *Wheat in Kansas*, 5.

[4] *Ibid.*

[5] *Ibid.*

As settlement progressed into central and western Kansas, new climatic and topographic conditions demanded new wheat varieties. What was needed was a wheat that could stand extremes of heat and cold and could grow with less rainfall than the older types demanded. These conditions were met by the introduction of the 'Turkey Red' hard winter wheat from Russia. This wheat, it is said, was grown in Kansas as early as 1872.[2] In that year a Mennonite immigrant who had settled in Harvey County planted the first seed. In the ten years following some fifteen thousand Mennonite immigrants settled in Kansas, bringing with them considerable quantities of this wheat. As it proved well adapted to the soil and climate, it was rapidly adopted by the farmers of other nationalities.[3] At first the producers encountered opposition from the local millers, who found the hard, flinty wheat difficult to grind on their old-fashioned millstones. As late as 1883 the millers of the State were arguing for the growing of Fultz and May and other soft varieties and giving scant consideration to the 'Russian' wheat.[1] Nevertheless the more progressive millers noted that this wheat was extraordinarily rich in gluten and therefore made a very strong flour, which, as the grain became acclimated, improved both in color and texture.[2] And in fact, when the millers had rebuilt their mills on a roller basis, they found no difficulty in making good flour from the 'Russian' wheat. In the course of time other varieties were introduced, such as the 'Kharkof' brought from Russia by the United States Department of Agriculture in 1900, and the 'Kanred' produced by the Kansas State Agricultural College. In recent years about ninety or ninety-five per cent of the wheat grown in the State has been of the hard type, and of this, it is estimated, about sixty-four per cent is 'Turkey Red' and perhaps twenty per cent 'Kharkof.'[3]

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[1] Kansas State Board of Agriculture, *Wheat in Kansas*, 22.

[2] Blackmar, *Kansas, A Cyclopædia of State History*, II, 903–04.

[3] The Mennonites were a religious sect, an offshoot of the Zwinglians with a scattering membership in Switzerland, Austria, and Prussia. In 1783 Catherine II of Russia invited them to settle in the newly conquered Crimea. With the lands they were given special privileges, among them exemption from conscription. The Mennonite colonies prospered greatly in Russia until in 1871 the Russian Government determined to revoke their special privileges. This caused the emigration referred to in the text. Their leader, Cornelius Jansen, came to the United States just about the time the Santa Fe Railroad was putting its central Kansas lands on the market and was induced to make a large purchase there. (Schmidt, 'Reminiscences of Foreign Immigration Work for Kansas,' Kansas State Historical Society, *Collections*, IX, 485–97 (1905–06).

The pioneer mills of Kansas date from the same decade as those of Minnesota (1850–60). The first is said to have been built by an Indian at Wyandotte[4] in 1852. It was apparently only a feed-mill, as the first bolted flour is said to have been made in a mill near Lawrence, in 1857. Atchison built its first mill in 1858 or 1859. Central and western Kansas saw no mills until the following decade, there being none at Wichita until 1876. Of course these mills were small affairs grinding only for local consumption. Usually they used water-power, although there was a notable one at Lawrence run by wind-power. Usually there was but little machinery:

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[1] *Northwestern Miller*, March 30, 1883, p. 296.

[2] *Ibid.*, Report of the Kansas State Millers' Association meeting.

[3] Kansas State Board of Agriculture, *Wheat in Kansas*, 22.

[4] Now Kansas City, Kansas. Fitz, 'The Development of the Milling Industry in Kansas,' Kansas State Historical Society, *Collections*, XII, 54 (1911–12).

only a single set of millstones and a hexagonal reel to do the bolting. The earliest were 'toll mills,' which were gradually succeeded by 'exchange mills,' which gave the farmer a fixed amount of flour — usually thirty to thirty-five pounds — for each bushel he brought, but did not return the identical grain. The 'exchange mill' in turn was superseded by the merchant mill.

The Census of 1860 showed thirty-six flour- and grist-mills in Kansas. In the following decade the number trebled, but after 1890 the numbers decreased.[1] The average size of the mills has increased steadily and with this has come a change of power. The opening-up of local coal-fields has permitted steam engines to replace the inadequate water-powers. In recent years there has been a growing use of Diesel engines because of the availability of cheap fuel oils. As a result the water-power mill has practically disappeared.[2]

A mill near the Missouri border opposite St. Joseph is said to have made the first shipment of flour out of the State in 1859. The first export to foreign countries was made by C. B. Hoffman, a notable pioneer miller of Enterprise, in 1882.[3] By 1890 there was a fairly well-developed trade with the West and South and certain European markets.[4] By that time centers of concentration were beginning to develop. In eastern and central Kansas, Topeka, Emporia, Lawrence, Leavenworth, Atchison, and Fort Scott each had from two to five mills. Farther to the south and west the Hoffman mill at Enterprise, the Brinkman mill at Great

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[1] Fitz, 'The Development of the Milling Industry in Kansas,' Kansas State Historical Society, *Collections*, XII, 53–59 (1911–12). *The Northwestern Miller* estimated that there were 210 mills in Kansas in 1923 (*Millers' Almanack* (1923), 192), while Fitz says there were 330 in 1876.

[2] Blackmar, *Kansas: A Cyclopedia of State History*, II, 215–20.

[3] The Kansas City Board of Trade *Reports* first note the foreign demand in 1885 (*Ninth Annual Report*, 10); the first shipments to London are said to have been made in 1892 (*The Roller Mill*, November, 1894, pp. 254–55).

[4] *The Roller Mill*, November, 1894, pp. 254–55.

Bend, and the Warkentin mills at Newton and Halstead had acquired more than a local reputation. After about 1888 agricultural depression retarded their growth and still later the advance of the Kansas City mills pushed them somewhat into the background.[1]

Kansas City was first a grain market and later a milling center. The grain trade had its beginnings about 1871, there being at that time two grain-buyers in the town, a single elevator, and only one mill. Later, buyers from St. Louis and Chicago appeared; by 1876 three more elevators had been built and the Board of Trade organized.[2] In the following years Kansas City became the commercial metropolis of all Kansas, southern Nebraska, eastern Colorado, and western Missouri. The junction of the Missouri and the Kaw Rivers formed a natural site for a great city. At first the development was all on the Missouri side; later there grew up a village on the Kansas side which also took the name of Kansas City and to-day the two form a single city econom-

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[1] Capacity in barrels per day of mills at milling centers in the Kansas area:

Missouri	1910	1927
Kansas City	10,800	28,750
Kansas		
Wichita	3,460	10,400
Salina	1,925	8,000
Hutchinson		5,800
Topeka	3,750	5,400
Atchison	1,450	5,050
Wellington	3,050	3,400
Great Bend		3,000
Arkansas City	1,550	3,300
Newton	1,070	2,725
McPherson	1,070	1,250
Enterprise	1,050	1,000
Leavenworth		2,500
Abilene		2,500

Oklahoma	1927
Oklahoma City	4,300
Texas	
Sherman	4,200
Wichita Falls	2,500
Dallas	4,940
Fort Worth	3,000
San Antonio	3,345
Houston	2,200
Nebraska	
Omaha	4,600
Schuyler	3,000
Lincoln	2,200
Iowa	
Davenport	3,550

(Fitz, 'Development of the Milling Industry in Kansas,' Kansas State Historical Society, *Collections*, XII, 59; *Millers' Almanack* (1927), 127).

[2] Kansas City Commercial Club, *Annual Report* (1891), 32.

ically speaking, though separated legally by the State boundary.[1]

The growth of the grain trade of the city caused the building of flour mills. By 1877 there were four of these producing over 60,000 barrels of flour annually and shipping both West and South.[2] To the Diamond, the Gate City, the Eagle, and the Central, as these mills were called, was added in 1879 the Zenith, and in 1882 the Kansas City Milling Company mill.[3] All these were small, except perhaps the last, the total capacity not exceeding twelve hundred barrels in the aggregate.[4] During the same period the city was becoming a market for the mills of the surrounding territory.[5] In 1880 a system of flour grades and inspection was established and efforts made to inaugurate the selling of flour by grade or sample. The country millers resisted these efforts, however, and in the same way insisted on sending their flour to the market in sacks, though the Southern trade demanded barrels.[6] This necessitated repacking by the middlemen and led to much blending of flours. When

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[1] Howe, *The Commerce of Kansas City* (1886), 181; Case, *History of Kansas City*, 243–48 (1888).

[2] Kansas City Board of Trade, *Annual Report* (1877), 98.

[3] Case, *History of Kansas City* (1888), 260.

[4] Howe, *Commerce of Kansas City* (1886), 182–83.

[5] Kansas City receipts and shipments, 1877–87:

	Receipts		Shipments	
Year	Bbls.	Sacks	Bbls	Sacks
1877	23,015	178,013	81,435	216,771
1878	70,638	218,071	60,194	160,478
1879	56,904	108,925	38,158	209,813
1880	23,894	86,085	23,106	134,840
1881	9,828	209,667	6,658	312,877
1882	8,423	456,888	4,703	536,748
1883	....	......	....	......
1884	50,602	732,134	59,996	866,997
1885	15,870	791,612	10,777	889,930
1886	3,545	542,590	10,393	492,545
1887	950	314,282	2,185	334,743

(Kansas City Board of Trade and Commercial Exchange, *Annual Reports*.)

[6] *Ibid*, 1880, 1885.

the export trade was developed, the foreign buyers also used the Kansas flours to blend with the weaker Australian, Argentine, and Indian wheat flours.[1]

The growth of the city as a milling and marketing center was hindered somewhat by the antagonism of the railroads[2] and restrictive legislation by the Missouri Legislature, which caused most of the elevators to be located on the Kansas side of the boundary, though the grain exchange and many of the mills were on the Missouri side. As late as 1890 there were only three mills, with a total capacity of only fifteen hundred barrels of flour a day. These were the mills of the Kansas City Milling Company[3] and the Zenith Milling Company referred to above and one belonging to the firm of Arms and Kidder.[4] The period of expansion began with the rapid growth and general recognition of the 'Turkey Red' wheat. Soon after 1890 the Kehlor interests of St. Louis, owners of a number of mills in that city and southern Illinois, built the twenty-five-hundred-barrel Rex mills.[5] Soon thereafter John Kelley, a miller of Leavenworth, moved to Kansas City, building an eighteen-hundred-barrel mill there.[6] In 1904 A. J. Bulte, who was operating a soft-wheat mill at Clinton, Missouri, erected the Bulte mill of eighteen hundred barrels' capacity in Armourdale, a suburb of Kansas City; a mill which is now operated by the Kansas Flour Mills Company.[1] In 1906 the Standard Milling Company, through its subsidiary, the Southwestern Milling Company, built a fifteen-hundred-barrel mill, which, after being destroyed by fire in 1913, was replaced by a thirty-six-hundred-barrel unit to which a second unit of twenty-two hundred barrels was added in 1919.

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[1] Kansas State Board of Agriculture, *Wheat in Kansas*, 179.

[2] Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), 121. Officials of the Missouri Pacific, when they built their line through Leavenworth, are said to have boasted that they would make Kansas City but a whistling point on the road. Various other lines were built to Leavenworth and Lawrence without touching Kansas City at all.

[3] Sterling, 'Flour Milling in Kansas City,' *The Kansas Citian*, August 31, 1920. Now operated by the Moore-Lowry Flour Mills Company, which is affiliated with the Wichita Flour Mills Company. (*Northwestern Miller*, December 12, 1923, p. 1098; *ibid.*, February 23, 1927, p. 753.)

[4] Sterling, 'Flour Milling in Kansas City,' *The Kansas Citian*, August 31, 1920.

[5] *Ibid.* This mill was destroyed by a fire in 1906 and the firm then withdrew from this territory.

[6] Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), 152.

The entrance of the Standard into Kansas City was a distinct recognition of the growing importance of the new milling center, for the Standard ranks next to Washburn-Crosby in the size and the extent of its operations. Soon after 1910 the Ismert-Hincke Company, millers of St. Louis, built a mill of twenty-five hundred barrels' capacity in Kansas City,[2] and were followed a few years later by the Shane Brothers Milling Company of Philadelphia, who built a seventeen-hundred-barrel mill in North Kansas City, now operated by the Midland Flour Milling Company.[3] In 1920 two new mills were completed, one owned by the Kaull Milling Company and replacing the old Arms and Kidder plant, and the other built by the Seaboard Milling Company, but now operated by the Rodney Milling Company.[4] Then in 1921 the fifteen-hundred-barrel mill of the J. C. Lysle Milling Company, now operated by the Monarch Milling Company, was completed,[5] and 1922 saw the entrance of the Washburn-Crosby Company with a three-thousand-barrel mill. By 1923 there were in the city eleven mills with a total daily capacity of 22,150 barrels of flour,[6] and an output of over four million barrels annually.[1]

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[1] *Northwestern Miller*, December 16, 1903, p. 1338.

[2] Sterling, 'Flour Milling in Kansas City,' *The Kansas Citian*, August 31, 1920.

[3] *Ibid.*

[4] *Ibid.*

[5] A subsidiary of the Commander-Larabee Corporation. *Northwestern Miller*, October 13, 1926, p. 139.

[6] Sterling, 'Flour Milling in Kansas City,' *The Kansas Citian*, August 31, 1920.

While milling was growing so rapidly within the city, there developed a concentration of ownership and control of the interior mills which brought them under Kansas City leadership. Many of the largest mills in the Kansas area are now combined into a few large corporations with headquarters at Kansas City. The most notable of these are: (1) the Kansas Flour Mills Company operating nine mills in the Kansas area and two others in the spring-wheat region;[2] (2) the Larabee Flour Mills Corporation with five mills in Kansas and Missouri;[3] (3) the Ismert-Hincke Company operating mills at Topeka and Bonner Springs as well as Kansas City; and (4) the Warkentin interests which control the Midland mill at Kansas City and three other mills in Kansas and Oklahoma. In addition, there are many wholesaling, jobbing, and brokerage firms in Kansas City and at least one large flour-blending plant. Thus the city has grown as a flour-marketing center also.[4]

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[1] Kansas City flour production, 1901–26 (by calendar years, in barrels):

1901	1,431,000	1914	2,376,000
1902	1,298,000	1915	2,865,000
1903	1,535,000	1916	3,146,000
1904	1,595,000	1917	3,365,000
1905	2,053,000	1918	2,469,000
1906	1,989,000	1919	3,628,000
1907	1,974,000	1920	3,597,000
1908	2,577,000	1921	3,965,000
1909	2,427,000	1922	4,707,000
1910	2,226,000	1923	4,886,000
1911	1,822,000	1924	5,218,000
1912	2,080,000	1925	5,410,000
1913	2,294,000	1926	6,179,000

(*Millers' Almanack* (1927), 143; Kansas City Board of Trade and Commercial Exchange, *Annual Reports*.)

[2] Now merged with the Valier and Spies Company of St. Louis operating three mills in St. Louis and southern Illinois through a holding company known as the Flour Mills of America, Inc. (See above, p. 189.)

[3] Now merged with the Commander group of the spring-wheat area. (See above, p. 159.)

[4] Sterling, 'Flour Milling in Kansas City,' *The Kansas Citian*, August 31, 1920; *Millers' Almanack* (1923), 195.

The large interior mills have apparently experienced no ill effects from this rapid growth of the Kansas City mills. While the latter have doubled in capacity in the years 1910–27, those of Wichita, Salina, Hutchinson, and Atchison have shown an even greater increase.[1] These mills have long since outgrown the wheat supplies of their immediate neighborhood and must bring in grain by rail, but since they all have the same milling-in-transit rates as Kansas City has, they are under no rate handicap in competition with the terminal mills. In general they do not purchase their wheat on the Kansas City exchange, but have established lines of elevators at country shipping points and buy directly from the farmers.[2] The recent extension of the dry-farming area through the increased use of the tractor and the combined harvester and thresher (the 'combine') has operated to compress still more the harvest period and the period of grain marketing and therefore increased the need for establishing such lines of elevators.[3]

The smaller interior mills, which are dependent on neighborhood wheat supplies and a purely local market, have not been so fortunate. In 1910 it was stated by C. B. Hoffman, of Enterprise (perhaps the most noted Kansas miller), that a mill of five hundred barrels' capacity, or larger, in a favorable location and efficiently managed, could hold its own with the largest terminal mills, but smaller mills were not able to do so. 'A mill of two hundred barrels' capacity and less must depend on a local market for its better grades of flour and is not large enough to command a market for its lower grades, as it does not produce enough. Hence it is at a decided disadvantage.'[4] Because of this situation many of the smaller mills have been forced out of business and the number of mills has decreased greatly in recent years.

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[1] See statistics above, p. 195.

[2] Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), 153–54.

[3] *Northwestern Miller*, September 1, 1926, p. 871.

[4] Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), p. 155.

The concentration of mills in central Kansas has not prevented an extension of milling to other parts of the hard-winter-wheat area. In Nebraska there are large mills at Lincoln, Omaha, Schuyler, and Crete.[1] In Oklahoma the chief center is Oklahoma City with large mills at half-a-dozen other points. In Nebraska both wheat-growing and flour-milling developed later than in Kansas, and the mills are smaller, more widely scattered and not as commercially important. In Oklahoma the mills started still later and as a result did not pass through the pioneer stage characterized by a dependence on a local market. On the contrary, the industry in that State was from the first characterized by centralization and large-scale production.[2] Lastly, there has been a considerable development of hard-wheat-growing and milling in eastern Colorado and northern Texas, in both States showing somewhat the same characteristics as in Oklahoma. In Colorado the Colorado Milling and Elevator Company operates a large group of mills making it seventh in size of all American milling companies. In Texas the Kell group of mills with headquarters at Wichita Falls is the outstanding producer.

The rise of the hard-winter-wheat mills necessarily had important effects on the market situation and on the other milling areas. Immediately there was a rivalry between Kansas flours and those of the spring-wheat area, since both were distinctively bread flours. In 1894 the Northwestern millers accused the Cincinnati inspectors of passing Kansas flours which were branded as Minnesota spring-wheat 'patents.'[3] It is quite possible that some Kansas millers were occasionally guilty of this practice, since the merits of Kansas flours were not as yet well advertised, while the Minnesota 'patents' were supreme in public estimation. We are reminded of James J. Hill's statement that the first shipments of Minnesota flour to Eastern markets were branded 'Muskingum Mills, Troy, Ohio.' [1]

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[1] See statistics above, p. 195.

[2] Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), 155.

[3] *The Roller Mill*, September, 1894, p. 138.

Rivalry and recriminations continued for some years thereafter. In 1900 there was a short crop of spring wheat and the Northwestern millers were said to have bought large quantities of Kansas wheat to mix with spring in producing a flour which was advertised as pure spring-wheat flour.[2] The Minneapolis millers denied this, claiming that the Kansas wheat was not good enough for such uses, but the Kansas millers reiterated the charge.[3] The Minneapolis millers were able to do this, they said, because the railroads had given them a milling-in-transit rate (Kansas City to Minneapolis to Chicago) that was as low as the rate given to the direct route.[4]

After about 1910 the merits of Kansas wheat became so generally recognized and the practice of mixing wheats to secure a uniform mill-mixture became so general that the argument was dropped. But the Kansas millers continued to complain of railroad rates, which they felt were unduly favorable to Minneapolis and the Northwest. In 1908, for example, they applied to the Interstate Commerce Commission for a reduction in their flour rate from the Missouri River to Chicago to make it equal the Minneapolis-Chicago rate. The Minneapolis millers opposed this request and the Commission denied it on the ground that the lower Minneapolis rate was justified by water competition on the Great Lakes. At this time accusations were also made that the Northwestern millers were getting secret rebates. Curiously enough, they were criticized, not for accepting these rebates, but for using them to cut into the territory and trade of the winter-wheat millers rather than to increase their profits.[5]

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[1] Hill, 'History of Agriculture in Minnesota,' Minnesota Historical Society, *Collections*, x, 277.

[2] *The Modern Miller* (St. Louis), July 28, 1900.

[3] *Ibid.*, August 18, 1900, p. 12; August 25, 1900, p. 19.

[4] *Ibid.*, July 28, 1900, p. 11.

[5] Milwaukee Chamber of Commerce, *Annual Report* (1908), 29.

The various rate controversies which followed will be discussed in another connection. In general the decisions in the later cases have been more favorable to the Kansas millers so that their situation has gradually improved. The final victory was announced in April, 1927, when the Interstate Commerce Commission upheld their contention that they were entitled to an equal rate with Minneapolis to Central Freight Association territory. The carriers had defended the lower rates to the Northwestern millers on the ground that these rates were compelled by water competition, but this time the Commission seems definitely to have rejected the plea.[1]

For a long period the Kansas millers were forced to accept a lower price for their best flours in competition with those of the Northwest. This they claimed was due not to the intrinsic merits of the latter product, but that 'due to the enormous amount of advertising, the public got the idea that the Northwestern flours were superior to any others.'[2] In the foreign markets, they claimed, their flour was rated higher than the spring-wheat flours. However, in the domestic market it was not until 1918 that the average price of Kansas flours rose above that of spring-wheat flours. Normally, it is slightly lower.

On the other hand, it is probable that costs are somewhat lower for the Kansas millers than for their rivals. Their mills are newer and more efficient, on the average. There is no scarcity of the best grades of wheat to drive the price to a premium as in the case of spring wheat. The demand for mill-feeds is increasing greatly in the Southwest so that better prices can be obtained for the by-products. At any rate, 'Millers operating simultaneously in the Minnesota, Kansas and Buffalo districts have testified before the Interstate Commerce Commission that flour is laid down in New York cheapest from Kansas, next from Buffalo, and highest from Minnesota.'[1]

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[1] *Northwestern Miller*, April 27, 1927, p. 359.

[2] C. B. Hoffman, of Enterprise, quoted in Douglas, 'History of Manufactures in the Kansas District,' Kansas State Historical Society, *Collections*, XI (1909–10), p. 157.

The problem of the Kansas millers is to create a larger demand for their flour. Supplies of wheat are increasing faster than flour production, yet the mills in the most favorable years grind only to about half their capacity. If more wheat were milled at home, it would relieve the railroads, since the flour shipments do not pile up during the autumn months as does the wheat. Hence the millers are anxious to secure relatively more favorable rates on flour. The railroads justify lower rates on wheat because of the lower cost of handling. Doubtless the farmer would oppose a change in this respect, but it would seem that the millers are justified in their request.

Better railroad rates would not necessarily increase the demand for their flour, however. The Kansas millers are increasing their advertising expenditure in order to convince the public of the superior merit of their flour for bread-baking. Much of their flour is shipped to blending plants in the soft-wheat area and there mixed with other flours, but the Kansas millers prefer to sell under their own brand. They have a bread flour which is little, if any, inferior to the best spring-wheat flour. While spring wheat is declining in quality and yields are decreasing, the contrary is true of the Kansas wheat. Hence all of the conditions are favorable to expansion once the markets are found. It seems likely, therefore, that the greatest future expansion of milling is to come in the hard-winter-wheat area. Whether Kansas City is to be the leading milling center of the country is more doubtful. It is certainly improbable that it will ever attain as dominant a position as that which Minneapolis held in the past generation. The smaller milling centers in the Kansas area are holding their own and it may be said that the present tendency in this area is to build up a series of smaller centers rather than to concentrate on one.

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[1] Taylor, *American Importation of Canadian Wheat*, Stanford University Wheat Studies, III, no. 1, November, 1926, p. 17.

CHAPTER VII

THE GROWTH OF THE MILLING INDUSTRY AFTER 1890—NEW MILLING CENTERS WEST AND EAST

I. FLOUR-MILLING IN THE PACIFIC COAST STATES

CALIFORNIA was the first of the Pacific Coast States to develop wheat-growing and flour-milling. This was in the period of Spanish rule, but no great progress was made until after the American conquest.[1] For a decade after 1848 the State was forced to bring in from the East large quantities of flour and other food supplies. After 1858, however, a surplus developed, an export trade was begun, shipments both of wheat and flour being made to Australia, to Great Britain, and to the Atlantic ports of the United States.[2] There had been a marvelously rapid growth, due partly to the opening-up of lands well adapted to wheat-growing, but mainly to the economic isolation of California and the high prices of the gold-mining era.

By 1881 flour exports amounted to nearly a million barrels and wheat production to over thirty-six million bushels. The small custom-grinding mills of the pioneer period had been

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[1] California flour production and exports, 1857–68:

EXPORTS FROM SAN FRANCISCO			RECEIPTS AT SAN FRANCISCO	
Year	Flour (bbls.)	Wheat (sks.)	Flour (bbls.)	Wheat (sks.)
1857–58	5,387	3,801	141,825	243,052
1858–59	20,577	123	274,216	433,002
1859–60	58,926	381,766	365,628	985,026
1860–61	197,181	1,529,924	455,115	2,160,723
1861–62	101,652	851,844	426,260	1,361,218
1862–63	144,883	1,043,652	638,353	1,864,652
1863–64	184,102	1,071,292	402,408	1,846,118
1864–65	77,501	30,309	242,601	474,207
1865–66	256,657	1,055,830	676,607	2,127,069
1866–67	485,339	3,639,625	1,166,793	4,851,915
1867–68	429,237	3,758,684	795,719	4,904,255

(Hazard and Ruggles, *Report on Cereals* (1869), 22–23.)

[2] *Ibid.*

replaced in many instances by large merchant mills using the 'New Process.'[1] But, though milling expanded rapidly, it could not keep up with the growing flood of wheat.

In the following decade was begun the shipment of both wheat and flour to China and Japan.[2] About that time (1891) occasional shipments of wheat began to flow eastward to the Minneapolis mills.[3] This wheat was cheaper than the hard red spring wheat, of the Northwest; it was cleaner, there being little dockage, and its large, plump kernels gave a larger flour yield. Because of the high transportation costs, and the fact that wheat production had so far outdistanced flour-milling, the California farmers had to take thirty cents per bushel less than was paid to Minnesota growers, but the yield per acre was so large that it was profitable to grow wheat even at fifty cents per bushel. The spring-wheat millers did not like the California wheat, however; consequently these sporadic shipments did not develop into a regular trade. They claimed the wheat was too soft and starchy and gave a yellow tinge to the flour. It was therefore unsatisfactory both as to strength and color.[4]

Indeed, California wheat production was already on the wane. 'California farmers,' it was stated in 1891, 'are realizing the folly of growing wheat for a glutted foreign market upon soil better suited for the production of special products.'[5] As the fruit-growing industry spread over the great central valley, wheat-growing gave place to it, and there was a gradual decline in both wheat-growing and flour-milling down to 1914.[6] By that date wheat production was down to less than six million bushels and flour production to 1.8

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[1] *Northwestern Miller*, April 22, 1881, p. 252; *ibid.*, March 2, 1883 (Supplement).

[2] *Ibid.*, April 3, 1891, p. 444.

[3] *Ibid.*, March 27, 1891, p. 409.

[4] *Northwestern Miller*, March 27, 1891, p. 409.

[5] *Ibid.*, February 6, 1891, p. 173.

[6] Federal Trade Commission, *Report on Commercial Wheat Flour Milling*, 29.

million barrels, the latter having fallen off nearly a third since 1899. The Great War brought a revival. Under the stimulus of war needs, and aided by the introduction of new wheat varieties of greater milling value, there was a great increase in wheat production. At the same time a concentration of ownership and a growth of large-scale production made possible a revival of milling. Neither in wheat-growing nor in flour-milling has the increase proved permanent,[1] though wheat production is still at a higher level than in pre-war years.[2] The inevitable expansion of other types of agriculture which have a comparative advantage over wheat-growing would seem to make a further recession inevitable, and, as wheat production declines, flour-milling will shrink still more. Thus California's flour production is not likely to exceed the amount needed for its own population, if indeed it can keep to that level, and the California mills, with a few notable exceptions, are not likely to play an important part in the world's flour markets.

Leadership has therefore passed to the mills of Oregon and Washington. In that region the Hudson's Bay Company is said to have built a mill at its trading post on the Columbia opposite Portland as early as 1828. Power was furnished by Indian ponies, and crude millstones fashioned out of fieldstones were the only machinery. In 1835 a water-power mill was erected and French buhr millstones imported around

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[1] Wheat flour output by States, 1909–25 (in barrels for census years indicated):

	1909	1914	1919	1921	1923	1925
Cal.........	1,805,248	1,783,007	3,383,303	1,907,034	2,508,755	1,615,000
Ore.........	1,360,281	1,791,334	3,341,756	2,527,866	3,301,274	2,550,000
Wash.......	2,804,242	3,765,070	5,911,381	4,470,253	4,818,997	3,770,000
Idaho......	386,022	571,965	1,104,634	787,092	903,883	786,000

(U.S. Census Bureau, *Biennial Census of Manufactures*, 1925.)

[2] Wheat production by States, 1912–25 (annual average, in million bushels):

	CALIFORNIA	OREGON			WASHINGTON			IDAHO		
	Winter	Winter	Spring	Total	Winter	Spring	Total	Winter	Spring	Total
1912–14..	5.7	14.3	3.3	17.6	28.0	21.0	49.0	9.0	5.3	14.3
1919–21..	11.7	18.7	4.0	22.7	31.0	16.3	47.3	9.0	15.3	24.3
1923–25..	11.0	14.3	6.0	20.3	22.0	19.3	41.3	9.7	14.3	24.0

(U.S. Department of Agriculture, *Yearbooks.*)

Cape Horn to furnish it.[1] At about the same time the first mill in western Washington was erected at Fort Colville, near what is now Spokane. In 1844 the first Oregon mill was built at Forest Grove. From this and other early Oregon mills flour was carried by pack-train to the California mining camps. In 1857 a shipload of flour was sent to Japan and in the following decades there developed a considerable export of flour to British Columbia, the British Isles, and China. In the early eighties the exports to Europe were most emphasized, but after 1885 this trade fell off and attention was turned to the Oriental trade. However, it was only after about 1890 that exports were large enough to play an important part in the world markets.[2]

Various types of wheat came to be grown in this region. The earliest settlers introduced the Sonora wheat from California, the Pacific bluestem, and other white varieties. In the cool, humid climate of the coastal region white winter wheats yielded well, but soon became soft, starchy, and yellow. Thus, while satisfactory for pastry flour, they would not make a good bread flour. Later, settlement spread to the 'Inland Empire' region, where light rainfall and hot dry summers made possible the growing of hard red winter wheats and these were introduced. In recent years there has been a spread of wheat-growing to the irrigated lands of southern Idaho, where soft white spring wheats are generally grown. In the dry-farming regions there is also a considerable growing of hard red spring wheats. On the whole, the soft white wheats predominate, but there is a greater variation in wheat types in this than in any other region.[3] In some respects this is an advantage in that it enables the millers to get a better milling mixture, but both millers and agricultural leaders are trying to secure a greater standardization and a concentration on a relatively small number of varieties.

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[1] Allen, 'Flour-milling,' Lewis and Miller, *Economic Resources of the Pacific Northwest*, 361.

[2] Allen, 'Flour-Milling,' Lewis and Miller, *Economic Resources of the Pacific Northwest*, 362–63; Hyslop, 'Grain Resources of the Northwest,' Lewis and Miller, *Economic Resources of the Pacific Northwest*, 47–56.

[3] Federal Trade Commission, *Report on Commercial Wheat Flour Milling*, 20.

The predominance of white soft wheats,[1] which produce weak, starchy flours quite unsuited for bread-making, constituted for years a serious problem for the Pacific Coast millers. Even to-day the mills in those sections where no other wheats are available must blend their flours with other stronger flours. Hence these millers purchase considerable quantities of Kansas and Minnesota flour to blend with their own product.[2] In recent years, however, they have successfully raised hard wheats in the Columbia River basin and more and more the larger Washington mills have come to depend on hard spring wheat from Montana. Mixing this with the better Pacific Coast wheats, they claim they can produce a flour which is almost as strong as the best Kansas and Minnesota 'patents.'

The attempt to draw Montana wheat to the Coast mills has aroused opposition both from the Montana mills and those of Minnesota. This is illustrated by the controversy over export rates in 1925–26. For some time before that date the Pacific Coast mills had been given a rate on Montana wheat to be milled for export which was seven cents per hundred pounds below the domestic rate. In February, 1925, the Southern Minnesota mills and the Duluth Board of Trade appealed to the Interstate Commerce Commission for the abolition of this rate on the ground that it was unfair

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[1] Estimated percentages of the different types of wheat grown in the Pacific Northwest, crop of 1918:

	Winter		Durum	Spring	
	Soft	Hard		Soft	Hard
Washington....	21	7		67	5
Oregon........	57	22		5	16
Idaho.........	30	22	2	34	12

(Federal Trade Commission, *Report on Commercial Wheat Flour Milling*, 108.)

[2] *Northwestern Miller*, December 26, 1923, p. 1325.

to them. The Montana mills joined in the movement and charges were made that the Coast mills were using the Montana wheat to mix with their own product for domestic sale, though receiving the export differential.[1]

It would seem as if any future expansion of milling on the Coast must be conditioned by the need of getting supplies of hard spring wheat from Montana, for in that State alone can they secure the strong, high-protein wheat which they must have.[2] That increase is likely to be so large that the local Montana mills will not for many years, if at all, be able to absorb it. Whether the surplus will be drawn westward to the Pacific Coast mills or eastward to those of Minnesota is mainly a question of freight rates. The rate situation, on the whole, appears to favor the Coast mills.

If they can control a sufficiently large supply of Montana hard spring wheat, the Coast mills may be able to play an important part in supplying bread flours to the chief Eastern markets. Such flour is now being supplied, to a slight extent, to the bakers in some of the Eastern cities. But their soft-wheat flours have created a much larger market for themselves in the Southeastern States, reaching that area by sea through the Panama Canal and distributing through the South Atlantic ports.[3] In their home market the Pacific Coast millers are in a better position than those of any of the rival sections. As long as they continue to be protected by high freight rates, they will meet with little competition except from the Montana mills in the north and perhaps the Kansas mills in California.[4] Since 1900 they have given increasing attention to their export trade. In shipping to

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[1] *Northwestern Miller*, February 11, 1926, p. 562; February 17, 1926, p. 666; July 22, 1926, p. 350.

[2] There is the further possibility that they may bring in Canadian wheat, grinding it in bond for export or paying the duty and selling the flour for domestic consumption. So far prohibitive freight rates have prevented this. (Taylor, *American Importation of Canadian Wheat*, 3.)

[3] Federal Trade Commission, *Report on Commercial Wheat Flour Milling*, 22–23.

[4] *Ibid.*, 105–06.

European markets they are handicapped by the length of the voyage which causes higher freight rates, insurance and interest charges. The prevalence of hand-to-mouth buying in recent years has made matters worse, since the distance makes it difficult for them to execute rush orders.[1] The bulk of their exports have, therefore, gone to China, Japan, and the west coast of South America. To these markets they can sell at lower prices than the millers of any other section. In general these markets demand low-grade, soft-wheat flours. The Coast millers' costs are lower because of shorter distances and cheaper wheat supplies.[2]

Since so much of the flour is made for export, or for shipment by sea to other sections of the country, milling is concentrated at the seaports to a much greater extent than in any other section. In recent years more than fifty per cent of the flour produced in the region has been manufactured in the three cities of Seattle, Tacoma, and Portland.[3] In these and other centers, the industry is dominated by a few large corporations which own many mills scattered over the whole territory. To a considerable extent they control the elevators, both terminal and country, so that they dominate the marketing and export of the wheat as well.[4] Most notable of these corporations is the Sperry Flour Company of San Francisco, owners of three mills in California, six in Washington, and one each at Portland, Oregon, and Ogden,

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[1] Allen, 'Flour Milling,' Lewis and Miller, *Economic Resources of the Pacific Northwest,* 375–77.

[2] The general problems of the export trade are dealt with in a later chapter. See below, Chapter XI.

[3] Concentration of flour-milling in the Coast cities.

State Output (fiscal year, 1917–18)		Output of Centers (calendar year 1918)	
Idaho	1,024,000	Seattle	1,290,000
Oregon	2,918,000	Tacoma	1,433,000
Washington	4,817,000	Portland	2,217,000
Total	8,759,000	Total	4,940,000

(*Millers' Almanack,* 1923, pp. 193, 208.)

[4] Federal Trade Commission, *Report on Commercial Wheat Flour Milling,* 105.

Utah, besides a large feed and cereal mill at Portland. This company also controls two subsidiaries owning and operating 220 interior and tidewater elevators with 14,500,000 bushels' storage capacity. The Sperry Company[1] has a daily capacity of 20,500 barrels of flour. Quite comparable to it is the Centennial Mill Company of Seattle, owning seven mills in Washington and one in Oregon, a total of 9400 barrels' capacity; the Globe Grain and Milling Company of Los Angeles with five mills in California and one in Utah, capacity 5900 barrels, and the Fisher Flouring Mills Company of Seattle, which has only one mill, but that of 6000 barrels' capacity.[2]

Summarizing, we may say that the future of the Pacific Coast mills is reasonably well assured. Their home market is bound to expand, as the population of the Pacific Coast is increasing rapidly, and in this they have an overwhelming advantage. It seems probable that they will have an increasing share in the trade of the Eastern markets, provided they can get supplies of hard spring wheat for mixing purposes at reasonable rates from Montana and Canada. The Pacific Coast millers also have a great advantage over the millers of other sections in having a foreign outlet for low-grade flours, which cannot be sold at home. In the Orient, with its teeming population, much of it as yet unacquainted with wheat flour, lies their greatest opportunity.

II. Buffalo as a Milling Center

In an earlier chapter mention was made of the importance of Buffalo's wheat trade before the Civil War. At that time

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[1] *Millers' Almanack* (1926), 134–35. See the *Northwestern Miller*, November 4, 1925, p. 455, for an account of the history of the Sperry Flour Company.

[2] Milling centers and capacity, 1925 (in barrels per day):

California		*Oregon*		*Washington*	
Los Angeles	1,500	Astoria	4,000	Pasco	1,000
San Francisco	2,300	Pendleton	1,800	Seattle	8,800
South Vallejo	5,000	Portland	11,025	Spokane	3,000
		The Dallas	2,100	Tacoma	9,600

(*Millers' Almanack* (1926), 139.)

the city was primarily a wheat-storage center, receiving the grain from lake vessels and forwarding it by canal and rail to Eastern mills or to the seaports for export. With the rise of the Northwestern mills Buffalo became a center for flour storage also.[1] The Minneapolis millers built large warehouses in which they could accumulate flour during the summer months when low lake freights were available,[2] the flour being then forwarded by rail to Boston, New York, Philadelphia, and other distributing centers. Buffalo itself became a distributing center whence flour was shipped to the interior towns of New York and Pennsylvania and especially to the coal-mining regions of those States.[3]

There were gristmills erected in the vicinity of Buffalo as early as 1804 or 1805, but probably none in the town itself until the erection of the old Frontier mill in 1832. The Erie mill was built in 1838, and the oldest of the present milling firms — Thornton and Chester — began business in 1845.[4] Shortly after the Civil War Jacob Schoellkopf built the Niagara and the Central mills at Niagara Falls, out of which grew the present Niagara Falls Milling Company.[5] The

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[1] Buffalo flour production and lake receipts, 1885–1926 (annual average, five-year periods, in barrels):

Years	Production	Receipts
1885–89	692,422	4,442,494
1890–94	696,803 *	9,026,132
1895–99	482,726 *	10,458,117
1900–04	593,985	10,389,425
1905–09	569,576	9,190,902
1910–14	2,569,576	8,090,200
1915–19	4,838,311	6,362,400
1920–24	6,397,930	6,090,200
1925	9,458,142	4,833,000
1926	9,671,829	....

* No production data for years 1893–97 inclusive.

(Buffalo Merchants' Exchange, *Annual Reports*, 1885–1904; *Millers' Almanack* (1923), 195; *ibid.* (1927), 141, 228.)

[2] *The United States Miller*, July, 1891, p. 102; October, 1892, p. 231.

[3] *Ibid.*, July, 1891, p. 102.

[4] *Northwestern Miller*, April 30, 1924, p. 488.

[5] *The Roller Mill*, September, 1899, p. 131; June, 1901, p. 618; *Northwestern Miller*, April 30, 1924, p. 493.

Urban mill, owned by the George Urban Milling Company, seems to have been started about 1880, and the Banner mills, now operated by the Buffalo Flour Mills Corporation, soon afterwards. By 1885 there were ten mills in the city producing in the aggregate about 750,000 barrels of flour annually. In addition there were eight mills in the vicinity of the city controlled by Buffalo firms whose output was nearly as large.[1] The circumstances which had created these mills were obvious: the wheat supplies of the Buffalo elevators, the local market of the region for which Buffalo was the distributing center, low transportation rates by lake and canal, and cheap power. The earliest mills were operated by water-power. When the limited immediate supply was exhausted, steam plants were used. But the development of the Niagara Falls water-power made the use of electric power inevitable and indeed this is chiefly relied on at the present day.[2]

By 1885 the Buffalo mills had largely outgrown local wheat supplies and the city aspired to be a spring-wheat milling center. As such it was brought into rivalry with Duluth, whence it drew much of its grain. Comparing the two cities in 1886, *The American Miller* was inclined to favor Buffalo.[3] There was not room for two very large centers in Minnesota, and apparently Minneapolis had grown too great to be overtaken. Buffalo had several advantages over Duluth: (1) coal, and consequently power, was cheaper; (2) wheat rates being relatively lower than flour rates, Buffalo mills could ship more cheaply to Eastern markets. (On the other hand, Duluth was closer to the source of the desirable spring-wheat supplies.)

In spite of its great advantages, Buffalo made little progress as a milling center from 1885 to 1903.[1] Toward the end of that period there was, in fact, a distinct decline. Many of the older, smaller, and less efficient mills had been scrapped and no new ones built to replace them. The Buffalo millers attributed this situation to railroad discrimination in favor of the Western millers. There were complaints in 1888 that the export rates to England were lower from Chicago than from Buffalo. The Minneapolis mills, especially, were said to have unduly favorable rates.[2] In 1901 Buffalo millers demanded the abolition of the practice by which the railroads allowed the Western millers free storage for their flour at Buffalo. This, they claimed, gave the Minneapolis millers an unfair advantage amounting to some fourteen cents a barrel.[3] Soon after this (in 1907) complaint was made to the Interstate Commerce Commission that the domestic rates to Atlantic Coast markets were unreasonably high as compared to those given Minneapolis, Milwaukee, and Chicago millers.[4]

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[1] Buffalo Merchants' Exchange, *Annual Report* (1885), 34–37.

[2] Clement, Buffalo: *America's Gateway to the Great Northwest*, 28–30. See also, below, p. 219, n. 2.

[3] *The American Miller*, XIV, 22.

In the first of these complaints (1888) the Buffalo millers did not secure any redress, but in both of the others the decision was favorable to them. The free storage privilege

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[1] Buffalo mills in 1893:

	Capacity	Output
Banner Milling Co. (2 mills)	800	198,850
Harvey and Harvey	900	152,500
Thornton and Chester	1000	194,000
George Urban and Son	800	184,161
Newman and Co., Akron	300	50,000
Schoellkopf & Mathews, Niagara Falls	2000	312,400
Cataract, Niagara Falls	700	139,370
Central, Niagara Falls	2000	255,000
McDonald, Tonawanda	200	52,282
Dodge, Williamsville	150	28,200
	8850	1,565,763

(*Northwestern Miller*, February 17, 1893, p. 234 b.)

[2] Buffalo Merchants' Exchange, *Annual Report* (1888), 47.

[3] *The Roller Mill*, August, 1901, p. 98.

[4] Banner Milling Company vs. New York Central and Hudson River Railroad Co., Interstate Commerce Commission, *Reports*, XIII, 31 ff. and XIV, 398 ff.

seems to have been the crux of the matter. Apparently the Western millers were allowed to unload and store their flour at Buffalo, in their own warehouses, repacking if necessary, and then shipping to Eastern distributing centers on a through rate from the mill that was materially lower than the sum of the two local rates. Under this system it was possible for the Western millers to ship large quantities of flour by lake steamers during the summer months and then fill Eastern orders from store at Buffalo on this through rate. In 1892, for example, they were said to have had 500,000 barrels stored at Buffalo when navigation closed.[1] It may be, therefore, that the decision of the railroads (in 1901) to withdraw the free storage privilege was the turning-point in the struggle. At any rate, Buffalo's flour production has grown steadily and rapidly since then. Not, indeed, because of the expansion of the native milling companies. Of the old-time Buffalo milling companies only two remain in business[2] and only one or two of the pioneer companies in the surrounding territory. None of these has experienced any very great growth. The recent expansion of Buffalo milling has been almost solely due to the migration of Minneapolis milling companies to that city.

The Washburn-Crosby Company began this movement in 1903 with the building of a three thousand-barrel mill which was enlarged in the next two decades to 22,000 barrels' capacity. This step occasioned a great deal of comment, the Washburn-Crosby Company giving the following explanation:[3] (1) Buffalo was a desirable milling center because of its position as a distributing center; (2) the withdrawal of the free storage privilege made it difficult to compete with Eastern millers on rush orders;[4] (3) the possibility of shipping wheat to Buffalo by lake steamers at very low rates; and, (4) the opportunity to mill Manitoba wheat gave Buffalo advantage over Minneapolis. The Canadian Pacific Railway had refused to let Minneapolis millers have Canadian wheat unless the flour made from it was shipped out over their subsidiary, the Soo Line. (5) Finally, the company expected to get cheaper power at Buffalo. At any rate, they were investigating relative costs of steam and electric power there.[1]

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[1] *United States Miller*, July, 1891, p. 102; October, 1892, p. 231; *Modern Miller*, February 16, 1901, p. 19.

[2] The Thornton and Chester Milling Company and the George Urban Milling Company.

[3] *Northwestern Miller*, January 28, 1903, p. 190.

[4] Though this was not the main point. See above.

The Pillsbury Company did not follow this example until 1922. In September of that year they announced their intention to build an eight thousand-barrel mill at Buffalo which plant was later enlarged to 10,000 barrels.[2] In December, 1923, the Russell-Miller Milling Company awarded contracts for a three thousand-barrel mill at Buffalo.[3] In September, 1926, the Standard Milling Company announced plans to build a ten thousand-barrel mill at Buffalo for its subsidiary the Hecker-Jones-Jewell Company, at the same time closing down their New York City mill.[4] In the same month the International Milling Company of Minneapolis announced plans for a large new mill at Buffalo,[5] and soon after the Commander-Larabee Corporation of Minneapolis obtained control of the Banner mills.[6]

The decline in Minneapolis milling resulting from these developments has been discussed elsewhere. Here we are interested rather in the growth of milling in Buffalo and the reasons for it. The advantages claimed for that city are stated by its Chamber of Commerce as follows:[7]

[1] Steam power seems to have been finally adopted because cheap coal was available. Later electric power was substituted.

[2] *Minneapolis Tribune*, September 27, 1922.

[3] *Northwestern Miller*, December 5, 1923, p. 997.

[4] *Ibid.*, September 8, 1926, p. 969.

[5] *Ibid.*, September 29, 1926. The company's principal mill is at New Prague, Minnesota. Subsidiaries operate mills at Sioux City and Davenport, Iowa, and Moose Jaw and Calgary, Canada. See above, p. 158.

[6] Operated through a subsidiary, the Buffalo Flour Mills Corporation.

[7] Letter from the Buffalo Chamber of Commerce, April 18, 1924.

(1) 'Buffalo is halfway between the Middle West and the Atlantic seaboard. It is the center of a great flour-consuming area. It is logical for mills to establish at Buffalo, because from Buffalo can best be supplied the consuming public in the New England States and in New York, Pennsylvania, New Jersey, Delaware, Maryland, etc.'

(2) 'The leading milling companies are coming to realize that it is more economic to manufacture flour in the sections where the consumption is the heaviest. They are less inclined to very long hauls on shipments of the finished product and prefer to bring their wheat to their manufacturing plants from a distance.'

(3) 'Bulk grain moves down the Lakes at a rate far below the rate on flour. The rates on grain on the Lakes are virtually established by bargaining between grain merchants and the lake carriers. . . . Rates on flour, on the other hand, are governed by the Interstate Commerce Commission.' As a result: 'Grain is shipped from Duluth and Port Arthur to Buffalo for five cents a bushel. . . . It costs twenty-eight cents a hundred pounds to ship flour from Minneapolis to Buffalo, and twenty-one and one-half cents from Duluth to Buffalo. The disparity favors the East end of the Great Lakes rather than the west end for milling.'

(4) 'The grain from the western provinces of Canada moves to Port Arthur at very low rates, much lower than the grain rates on the western railroads of the United States. Millers say that the grain from western Canada can be brought to Port Arthur at a transportation cost that is lower than the rate from western Canada to either Duluth or Minneapolis. By locating at Buffalo the millers are able to place themselves in the direct line of this east-bound flow of Canadian wheat. Under government regulation this grain can be milled-in-bond and shipped abroad without the duty having been paid on the wheat from Canada. Thus the Buffalo millers are able to compete with Canadian millers for export business.'

Only very great advantages over other centers could account for such a rapid growth as Buffalo has witnessed in recent years. It is remarkable, however, that only the Minneapolis millers are making use of them. As we have shown, the only new mills, with one exception, that have been built at Buffalo are the properties of the Minneapolis companies.[1] None of the purely local companies has experienced any very considerable growth. The same is true of the mills at Lockport, Tonawanda, and the Niagara frontier, which, presumably, shared in the advantages of Buffalo.

It is noteworthy that no mention is made of some of the advantages we have learned to associate with earlier milling centers. There is no mention of a local wheat supply, for example. Though western New York still raises a great deal of wheat very little of it is ground by the Buffalo mills. Nor is cheap power mentioned, though Buffalo undoubtedly has a slight advantage over other centers in cheap electric power from Niagara Falls and in cheap coal from near-by fields.[2]

As to the advantages which have been listed above only brief comment is necessary. Buffalo's location at the heart of a great consuming area makes it an important flour distributing center, but not necessarily a milling center. Otherwise one would expect New York City to become our greatest milling center which it shows no signs of doing. In general one is inclined to doubt the truth of the assertion that 'it is more economic to manufacture flour in the sections where the consumption is heaviest.' The rapid growth of the mills of the Kansas district seems indeed to indicate a movement in the other direction. Doubtless there is a tendency — owing to greatly increased railroad rates — for the industry to become decentralized and to build up milling capacity in each consuming area. From that situation, alone, one would expect some increase of milling capacity in the Buffalo district. Moreover, the growth of the city as a distributing center has also aided the Buffalo mills in their advance. Much more important, however, are the changes in rates which have put Minneapolis and Duluth at a relative disadvantage. While grain rates from Duluth to Buffalo are now practically down to pre-war level, flour rates are still substantially higher than before. A wheat rate of five cents per bushel and a flour rate of twenty-one and a half cents per hundred pounds undoubtedly encourages the shipment of wheat rather than flour. The all-rail rates via Chicago show no such discrimination against flour, but in general are so high as almost to force the flour shipments to the East to take the lake route. 'Under tariffs in effect for the past six years,' according to *The Minneapolis Tribune*, 'grain shipped from Duluth by water, milled in transit at Buffalo and laid down in New York, had an advantage of more than fifteen cents per hundred weight over flour milled in Minneapolis and shipped all-rail.' [1]

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[1] The Standard Milling Company is not, strictly speaking, a Minneapolis concern, though it operates a group of mills there through its subsidiary, the Northwestern Consolidated Milling Company.

[2] The newer mills, e.g., the Washburn-Crosby Company mill, use electric power exclusively and the older ones have at least partly gone over to electric operation. (*Northwestern Miller*, April 30, 1924, p. 485, 489.)

Thus in milling American-grown spring wheat and selling the flour in New York and New England, the Buffalo millers have a considerable advantage over those of Minneapolis and Duluth. But we have shown that the real weakness of the Minneapolis position lies in the declining production of high-quality spring wheat forcing the price to a premium above equally valuable grades in other regions. This disadvantage Buffalo shares, to some extent, with its rivals. All three cities find it increasingly difficult to sell flour made from American-grown spring wheat in competition with Canadian flour or flour made from Canadian wheat, or Kansas hard-winter-wheat flour. Buffalo has an advantage over the other cities, however, in that it can secure supplies of Kansas wheat for mixing without the out-of-line haul which milling in Minneapolis or Duluth would involve.

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[1] July 31, 1926.

With regard to its supplies of spring wheat, Buffalo might neutralize the disadvantage in two ways: (1) Lower freight rates might offset higher wheat costs. At present, however, the Canadian railways are giving lower rates from the wheat country to the head of the Great Lakes than are the American, and the lower rates to Europe through American ports are equally open to them. (2) Buying high-grade Canadian wheat, the Buffalo millers can mix it with lower grades of American spring wheat which are not at a premium.

The ability to draw Canadian hard-spring wheat is probably the chief factor responsible for Buffalo's recent milling growth. This wheat, the product of the prairie provinces, is brought by rail to Fort William and Port Arthur and thence transported by lake boats either to Eastern mills or to the seaports for export. Because of the short season of lake navigation, much of it is carried to Buffalo where there are extensive elevator and storage facilities, and whence much of Canada's export wheat is carried to Europe through American ports. Thus there is a constant stream of Canadian wheat passing through Buffalo and large quantities are constantly in store there from which Buffalo millers can purchase what they need. This wheat, moreover, is superior in quality to most American spring wheat, having a higher protein content and yielding more and better flour per bushel. It can be purchased on the Winnipeg exchange at lower prices than equal grades of American-grown wheat can be bought in Minneapolis and reaches Buffalo under lower transportation charges.[1]

Imports from Canada must pay a duty, however. After a period of free trade in wheat and flour, the emergency Tariff Act of 1921 placed a duty of thirty-five cents a bushel on wheat. In the Fordney-McCumber Tariff this was lowered to thirty cents. But in April, 1924, following an investigation of relative costs of wheat-growing in the United States and Canada by the United States Tariff Commission, President Coolidge increased the duty to forty-two cents a bushel with a corresponding increase in the flour duty.[1]

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[1] Taylor, *American Importation of Canadian Wheat*, 10 ff.

Data are not available as yet to indicate how far this will cut down Canadian importations. These naturally fluctuate very greatly with the variations in the quantity and quality of the American and Canadian crops. A short crop of American spring wheat and a big Canadian crop will encourage importation to a marked degree, since the best grades of American hard-spring wheat will be at a premium above the regular price, while the Canadian price at Winnipeg on comparable grades of Canadian wheat will be much lower. Under such conditions the American miller may find that wheat purchased at Winnipeg, even after paying the duty, is cheaper than corresponding grades of American-grown wheat.

Where the miller finds that his supplies of American-grown wheat are low in protein or lacking in strength, he may find it necessary to buy Canadian wheat simply because corresponding grades of American-grown wheat are not available. This is also true when he must supply bakery demand for very strong flours which he can produce only by milling high-grade Canadian wheats straight. In any case, as recent studies have shown, Canadian wheat imported for domestic-consumption flour 'is largely purchased at opportunity prices as additions to stocks of domestic wheats.'[2] For this type of purchasing the Buffalo miller, because he is right on the ground, has obvious advantages over the Minnesota millers. Such imports have averaged about six million bushels annually in recent years, and while it is clear that many mills east and south of the Great Lakes have obtained part of this wheat, it is probable that the bulk of it has been ground by the Buffalo mills.[1]

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[1] Taylor, *American Importation of Canadian Wheat*, 1. The duty on mill-feeds was, however, cut in half. The millers protested against this claiming that it took away any advantage resulting from increased flour duties, since the Canadian miller, having a better market for his feeds, could quote a lower price on his flour in American and foreign markets. For this problem of Canadian competition in foreign markets, see below, pp. 299–300.

[2] *Ibid.*, 15.

More important than the importations for domestic consumption are those for manufacture of flour to be exported. The miller may import his wheat, pay the duty, and collect a drawback when the flour is exported. This method is used very little, however. More commonly used is the method of milling-in-bond, in which the miller sets aside a complete milling unit, manufactures the wheat into flour under Government inspection, exports the flour, and, if he cannot export the offals, pays the duty on them and sells them in the domestic market.

Both milling-in-bond and milling under the drawback system as practiced at Buffalo represent 'virtually a milling-in-transit of Canadian wheat moving overseas through the United States. The tendency thus to mill Canadian wheat is increasing as American wheat of a comparable grade becomes too expensive to mill into standard flour for export.'[2] This grinding of Canadian wheat for export is confined almost altogether to the Buffalo district, and there can be no doubt that Buffalo enjoys marked advantages over all other rivals, particularly as it has a choice of ports through which it can ship. However, only those milling companies operating on such a large scale that they can devote a whole mill constantly to the export business can take advantage of such a situation. This, perhaps, accounts for the fact that

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[1] Wheat imports of the United States, 1921–26, in thousand bushels:

YEAR JULY–JUNE	IMPORTS FOR EXPORT OF FLOUR	IMPORTS FOR CONSUMPTION (duty paid)	TOTAL GENERAL IMPORTS
1921–22......	6,173[a]	8,456[b]	14,466
1922–23......	9,281	7,408	18,013
1923–24......	13,905	13,783	27,277
1924–25......	5,813	273	6,169
1925–26......	13,470	1,644	15,583
Average......	9,728	6,313	16,302

a. Nine months only (October–June).
b. Includes June, 1921.
(Taylor, *American Importation of Canadian Wheat*, 2.)

[2] *Ibid.*, p. 33.

only the large Minneapolis companies through these Buffalo mills are taking advantage of the situation.

It is not meant, here, to imply that the rapid growth of the Buffalo mills has been solely due to their advantage in the use of Canadian wheat. The Buffalo mills are large, well-planned, and well-equipped, so that manufacturing costs are reduced to a minimum. They have favorable rates eastward to the great consuming centers as well as westward into the American wheat-fields. They are strategically located for the using of wheat from the three main American sources of supply: the Northwestern hard-spring wheat, the Southwestern hard-winter, and the south-central soft-winter, all of which they can grind to advantage, milling them straight or in any desired mixture.

Summarizing, we may say that while the growth of the Buffalo mills in recent years has been greater and more rapid than that of any other center, that growth seems mainly founded on two highly precarious advantages, (1) the continuance of the discriminating low freight rates on wheat on the Great Lakes, and (2) the continuance of the inflow of Canadian wheat which can be milled without payment of duty under the milling-in-bond system. Recent efforts of the Minneapolis millers to secure a lowering of freight rates on wheat from the Northwest and Southwest and a lowering of the all-rail rate on flour to the East to such a point as would make it once more competitive with the lake grain rates were unsuccessful, but future attempts may have a different result, particularly if the public can be convinced that the farmer will be benefited thereby.[1] Such efforts, if successful, would build up milling in Minnesota and correspondingly decrease production at Buffalo. Again, it was reported in 1925 that the Canadian millers were petitioning their Government for an export duty on wheat shipped into the United States for milling-in-bond. Whether they succeed in getting it or not, recent studies have shown that the Canadian millers have lower costs of production (chiefly in the matter

[1] As the Minnesota millers are arguing at the present time (1927).

of labor) than the American, and so should be increasingly able to win the foreign markets from the Buffalo mills. It is clear, therefore, that, even though there be no change in the present situation, the Buffalo mills will find it increasingly difficult to maintain their foreign markets against the Canadian mills over which they have no advantage in manufacturing or wheat costs, and their domestic business in Eastern territory where they have to meet the competition of the Kansas mills. As against the latter, Buffalo has advantages in lower freight rates, but the same disadvantage as other spring-wheat centers, namely, higher wheat costs. In any case the Buffalo millers are reaching only a small part of the national market. 'With full appreciation of the present advantages of the Buffalo district, one must not exaggerate them. They may be expected to persist so long as the milling capacity does not overrun the consuming markets. This means that flour from Buffalo holds advantages for export trade and in Atlantic states, but the situation would be altered if flour production in the district were to be so expanded as to necessitate a westbound movement of flour.' [1]

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[1] Taylor, *American Importation of Canadian Wheat*, 23, n. 2.

CHAPTER VIII

THE GROWTH OF THE MILLING INDUSTRY AFTER 1890 — MILLING METHODS AND PRODUCTS

After 1890 there were no changes in milling machinery or methods comparable to those of the previous twenty years, the most important developments arising, as has been shown, out of the changes in markets and the growth of new milling centers.[1] The demand for ever-finer and whiter flour led, however, to the introduction of new sifting machines and artificial bleaching processes, while the necessity of bringing in wheats from wider and wider areas caused a complication of the processes of cleaning and conditioning wheat. Varied raw materials and large-scale buying, which demanded above all things uniform quality in flour, led to the introduction of scientific methods of wheat and flour testing, and lastly, new changes in market tastes and demands caused an increasing diversification of products.

I. Changes in Milling Machinery

In the matter of milling machinery, the chief change after 1890 was the introduction of the automatic sifters known originally as 'plansifters.' The gradual reduction process, which had come into general use by 1890, involved an increased use of and a diversification of the bolting machinery of the mill. The meal coming from a set of rolls contains a mixture of bran, middlings, and flour particles of various sizes. If, after the bran has been separated, this stock is sent through the next set of rolls, the results will not be satisfactory. The particles smaller in size than the distance between the rolls will pass untouched. If the rolls be set close enough to catch everything, the larger particles will be broken down too violently, and the quality of the flour injured. Moreover, the greater pressure required would cause a waste of power. Thus sifting and bolting are necessary not only to separate the flour and bran from the rest of the meal, but also to grade the particles of meal according to size. Hence the modern mill is distinguished from the mill of two generations ago chiefly by the much larger proportion of bolting machinery which it contains.[1]

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[1] Minneapolis Chamber of Commerce, *Historical Sketch*, 26.

It was shown in a previous chapter that bolting methods were greatly improved by the introduction of the centrifugal reel, which was smaller, used less power, and yet had a capacity five times greater than the older hexagonal reels.[2] For the separations following the first three breaks, the centrifugal continues to be used, but for the separations following the use of the smooth or reduction rolls — that is, the reduction of the middlings — it has been largely replaced by a new type of machine which was originated by Karl Haggenmacher in 1888.[3] They are said to have been introduced in the Pillsbury mills in 1892,[4] this probably being their first use in the United States.[5] Their present form dates from Wilson's machine patented in 1900.[6] In these machines, square or cylindrical boxes, containing a series of flat sieves, are given a gyratory motion, while various arrangements of 'tappers' and brushes assist the bolting by keeping the meshes of the cloth open. For the final stages of flour-making they seem to be superior to the centrifugal reel, occupying less space, using less power, and doing more and better work. Experiments of German millers as early as 1889 indicated that the plansifters were fully fifty per cent more efficient than the reels in separating the flour from the middlings.[1] For this type of work they are universally used in all the larger mills.

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[1] Kozmin, *Flour Milling*, 316–17.

[2] *Ibid.*, 342–43.

[3] *Ibid.*, 68.

[4] *The Roller Mill*, April, 1892, p. 543; November, 1894, p. 265.

[5] *The Modern Miller*, January 5, 1901, p. 3. Advertisement of Barnard and Leas.

[6] Ladd, 'Patents in Relation to Manufactures,' *United States Census*, 1900, x, 771.

So, too, the period saw a complication of the wheat cleaning and conditioning machinery. Wheats of many different types were being brought together to form a mill-mixture. Each required a different treatment to bring it into proper condition for milling. Deterioration in wheat supplies caused an increasing use of separating machines to take out dirt, weed seeds, and other foreign material. Often the miller found that he had on his hands smutty wheat or wheat that had deteriorated in other ways which had to be reconditioned before being used. In this case also improvements date from the introduction of various German wheat-washing and drying machines about 1890.[2]

In the older 'New Process' mills, the automatic character of the machinery ended at the packing-floor, the packing process being still one of hand-labor. Even to-day there are many large and modern mills of which this is true, but gradually the newer mills are making greater use of conveyors, mechanical flour-pilers, and other labor-saving devices of that type. The packing-machines themselves have become automatic so that the measuring and weighing is no longer dependent on the packers, and sack-sewing machines eliminate the most important item of hand-labor.[3]

We may note, too, the improvement in the accuracy and precision with which milling machinery was constructed. Prior to 1870 there were few shops for the making of machine tools in the Mississippi Valley and hence machinery was often of poor quality.[4] But in 1879 *The Northwestern Miller* noted that 'Since the introduction of new process milling it has been found necessary to carry the exactness of detail and nicety of construction into all the machinery and processes used in the mill.'[1] Lastly, there was an improvement in mill architecture as a result of which light, flimsy, wooden structures, designed only to provide protection for the machinery, were replaced by structures of brick, stone, or concrete, and the square, heavy lines of the older structures were abandoned for buildings of a new type which, in spite of their obviously utilitarian character, are not without a certain dignity and impressiveness.

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[1] Kozmin, *Flour Milling*, 390.

[2] Edgar, *The Medal of Gold*, 188.

[3] *Modern Miller*, March 30, 1901, p. 18. Invention of a sack-sewing machine by a miller at the Pillsbury A mill. (*Northwestern Miller*, March 1, 1922, p. 948, 'Labor-Saving Machinery.')

[4] Roe, *English and American Machine Tool Builders*, 261.

II. WHEAT- AND FLOUR-TESTING

More important than these plant improvements was the development of more scientific milling methods as represented by the new methods of wheat- and flour-testing. The old-time miller, having no scientific training, bought the best wheat available at the lowest price he could get it for, and made the best flour that he could. If his product varied greatly in strength and quality in the milling of successive batches of wheat, he did not analyze the situation further than to blame the wheat. Multiple reduction and large-scale production forced the miller to study not only methods of milling, but raw materials and product as well. The new methods had to be adapted to various types of wheat. New markets demanded various types of flour. Under such influences scientific wheat- and flour-testing had its beginning.

In this matter also the Americans copied European methods at the start. The English millers, having to deal with a wide variety of different kinds of wheat, were the first to make a study of wheat-mixing. As early as 1880 American milling journals began to print extracts from scientific articles by European experts on this topic.[2] In America, C. A. Pillsbury seems to have taken the lead in adopting new methods. In 1889 it was stated that he had two men constantly employed in testing wheat as it came into his mills. By this means he was able to mix low-grade wheats with higher and still maintain a certain standard of strength.[1] Incidentally, it was possible by this method to preserve a uniformity of quality in the flour.

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[1] November 14, 1879, p. 315.

[2] See, for example, an extract from a lecture by Professor Graham before the London Society of Arts printed in *The Northwestern Miller*, March 19, 1880, p. 181.

Strength and quality in flour, it should be said, are not synonymous terms. A flour of high quality for pastry and cakes is a low-strength flour, while one to be used for bread-baking must be strong to be of high quality.[2] Strong flour, containing much gluten, expands greatly, thereby making a light bread. It absorbs much water which is an advantage to the baker who sells his bread by weight. Hence the baker has always demanded strong flours not merely because of the greater yield (in loaves per barrel), but because strong flour 'will, all things being equal, stand the necessary fermentation to bring out true color, flavor, volume, and texture.'[3] This has proved increasingly true with the increased use of machinery for bread-making in large-scale bakeries.

While hard wheats, generally speaking, make high-strength flours and soft wheats, low-strength, it is only the larger bakeries that can afford to keep different types of flour on hand. For household purposes, where only one kind of flour is kept, one of medium strength is preferred, a flour that will make good bread, but can also be successfully used for biscuits and pastry.

In part this was a problem of flour chemistry, as we shall see; but first of all it was the problem of securing a proper wheat-mixture to give just the degree of strength required, and then, once obtained, to make sure that the flour would be uniform in quality. It is obvious that the small mill depending on local wheat supplies which varied greatly in quality from season to season would find it very difficult to secure a stable quality flour. For example, the Russell-Miller Company, operating several small mills in North

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[1] *Northwestern Miller*, November 8, 1889, p. 515.

[2] Saunders, *Quality in Wheat*, 8.

[3] *Northwestern Miller*, December 26, 1923, p. 1324.

Dakota, found their flour varying so greatly from one mill to another and from season to season that it could not be sold under a single trade-mark until it had been shipped from the mills to their Minneapolis plant and there blended to secure uniformity.[1] In this matter the terminal millers, being in somewhat closer touch with large and varied wheat supplies, undoubtedly have an advantage over those of the interior.[2]

The great difficulty is that the system of wheat-grading now in use emphasizes certain external factors, such as hardness, plumpness of kernel, color, and weight, which do not always correlate closely with milling quality. This the cereal chemists have shown is largely dependent on the chemical composition of the wheat; its protein content and the quantity and quality of the gluten it contains.

A. W. Howard seems to have been a pioneer in this work of wheat- and flour-testing. After he had established his laboratories in Minneapolis in 1885 the testing of wheat samples for their chemical composition became the rule for the larger mills.[3] The customary procedure now is as follows: At the beginning of the harvest samples of the new wheat are obtained from many different localities over a large area. These are tested by the cereal chemists, and on the basis of these tests it is customary to make maps of the wheat area showing the protein content and the gluten strength of every district in the area.[4] This varies from one locality to another because of differences in precipitation, temperature, sunshine, and the condition of the wheat between cutting and threshing.[5] Having mapped the wheat area in this way and having determined the proportions of wheat of each type necessary to secure a proper mixture, the miller is in a position to make his purchases intelligently. Formerly only the gluten content was considered, the assumption being that there was a uniform spread between the amounts of gluten and the total protein contained, but quite recently this has been shown not to be the case. The present tendency is, therefore, to buy wheat on a protein guarantee.[1] In either case the actual milling of the wheat proceeds only after careful testing of wheats in different bins, a careful mixture to secure a certain definite combination and strength, followed by milling and baking tests thoroughly to try out the mixture.

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[1] Based on interviews with Minneapolis millers.

[2] *Northwestern Miller*, March 26, 1924. Advertisement of the Washburn-Crosby Company. 'With great terminal elevators holding millions of bushels of wheat . . . the Washburn-Crosby Company is not dependent upon the quality of the wheat crop in any one locality, but is able, regardless of conditions, always to maintain the uniformity, goodness, strength and color of Gold Medal.'

[3] *Northwestern Miller*, October 7, 1903, p. 782.

[4] *Ibid.*, December 26, 1923, p. 1299.

[5] Bailey, *Chemistry of Wheat Flour*, 84.

The flour tests have proved even more important than the wheat tests. From early times flour-buyers judged the product mainly by its external appearance, its granularity or softness, its color and odor.[2] Before 1850, however, chemists had begun to make analyses of flour samples and millers had begun to appreciate the importance of the various chemical constituents of the flour, particularly the gluten.[3] The Howard Laboratories seem to have convinced the progressive millers of the practical value of these tests and gradually they became part of the regular milling process. While the smaller mills are dependent on privately owned or coöperative laboratories at the milling centers, the larger companies have their own with a complete staff of flour-testers, chemists, and bakers. Washburn-Crosby established such a laboratory in 1893.[4] The flour-testers collect samples of each day's output, testing the flour as to its color, doughing properties, and texture. Then they compare these results with those of the previous day or week. The chemists test the flour for moisture, ash[1] and gluten content, and work on the special problems having to do with the improvement of the quality of the product. The laboratory also includes a complete bakery, since each lot of flour must be tested for the baking qualities, the bread being judged as to color, shape, texture, odor, volume, and weight, as well as the number of loaves it will yield per barrel.[2] Neither gluten test nor protein test gives all the information necessary. Both are useful, but both are subsidiary to the baking test.[3]

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[1] *Northwestern Miller*, December 26, 1923, p. 1299.

[2] Saunders, *Quality in Wheat*, 10.

[3] Beck, 'Second Report on the Breadstuffs of the United States,' *United States Patent Office Reports, Agriculture* (1850), 81–82. Table exhibiting the composition of various samples of American and foreign wheat flours.

[4] Edgar, *The Medal of Gold*, 190, 255.

The laboratory is therefore an important part of the large modern mill. In recent years its functions have been greatly extended. The Washburn-Crosby laboratory has given chemical training to prospective head millers, has helped the bakers solve their baking problems, and provided 'kitchen-tested' recipes for housewives.[4] Finally the company has built an experimental mill (1908) for the use of the testing department,[5] an example followed by the State of Minnesota which in 1921 built at Minneapolis a hundred-barrel experimental mill to be operated by the Agricultural Experiment Station 'for the purpose of making scientific tests to ascertain the true milling value of spring wheat.'[6] Two years later the National Government provided a mill at Washington to be used for wheat- and flour-testing by the Department of Agriculture.[7]

III. Flour-Bleaching

Probably the most important change in processes in this period was the introduction of flour-bleaching. In the early days flour, when finished, was stored for several months. This was especially necessary at the beginning of the crop year. This ageing 'was believed to mature the gluten in some way so that its bread-making qualities were enhanced.' During the process the flour lost its natural creamy color and became pure white.[1] Gradually the public became accustomed to this color so that they apparently judged the quality of flour by its whiteness. By the time the roller process was introduced, flour dealers were demanding the whitest possible flour for their best trade.

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[1] 'Ash content has been more extensively used as a criterion of flour grade than any other characteristic of flour except possibly the color. . . .' (Bailey, *Chemistry of Wheat Flour*, 148.)

[2] *Minneapolis Survey*, 333.

[3] *Northwestern Miller*, September 20, 1922, p. 1288. C. H. Briggs, of the Howard Laboratories, 'Concerning Protein and Gluten.'

[4] Edgar, *The Medal of Gold*, 255.

[5] *Ibid.*

[6] *Northwestern Miller*, September 21, 1921, p. 1331.

[7] *Ibid.*, May, 1923, p. 502.

The method of ageing had some disadvantages, however, since it required large warehouse space and tied up much capital in the finished product. With severe competition and smaller profit margins, millers sought for a way to escape the burden. The remedy they found was the artificial bleaching and ageing of flour.

In England a patent for a flour-bleaching process was issued as early as 1879.[2] There are indications that the process was experimented with in the United States soon after that date; [3] but artificial bleaching did not become important until after the introduction of the Alsop process in 1904.[4] This soon became the principal process used, though various others are in general use to-day.[5] Whatever the process used, the economy of bleaching, together with the public demand for a whiter flour, resulted in the almost universal adoption of artificial bleaching within a very few years.

Except as regards color, the bleaching, if properly applied, did not alter the essential properties of the flour. The general public used the bleached product without suspecting any change. There had arisen about 1895, however, a great deal of public criticism of white bread and 'patent' flour. In part, this came from physicians, who were presumably actuated only by scientific motives;[1] in part it seems to have come from the newly risen breakfast-food industry, many of whose members sought to create a market for their product by attacking white flour. One result was the introduction of a great variety of 'health' flours, such as graham, whole-wheat, and entire-wheat.[2] Another was the institution of a series of investigations to determine the effect of artificial bleaching. The pioneers in this field were E. F. Ladd and R. E. Stallings, the Food Commissioners of North Dakota, who published in 1906 what *The Northwestern Miller* called 'a vicious attack' on white flour.[3] Their experiments were followed by others, the general tenor of the results they reported being that the acidity of the flour was increased and its digestibility decreased by artificial bleaching. Experiments on animals, it was claimed, showed that bleached flour, especially if slightly over-bleached, had a markedly toxic effect.[4] From this it was concluded that artificially bleached flour was unfit for human consumption. There were other investigators, however, both in Europe and America, who denied these claims and asserted that there were no injurious effects from the use of artificially bleached flour.[5]

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[1] Hale, *The Bleaching of Flour*, 3. Loaf volume, baking strength, and color of crumb are improved by storing flour up to two or three years, as experiments have shown. (Bailey, *Chemistry of Wheat Flour*, 189–93.)

[2] *Ibid.*, 5.

[3] *The American Miller*, XII (1884), 21.

[4] *Northwestern Miller*, December 24, 1919, p. 1375.

[5] See Bailey, *Chemistry of Wheat Flour*, 194 ff., for a full discussion of the various processes used.

As a result of this agitation Congress put into the Pure Food and Drugs Act of 1906 some provisions affecting the milling industry. Artificially bleached flours must be so labeled; if the bleaching agency was likely to prove harmful or injurious, the departmental authorities were given power to bar flour so bleached from interstate commerce.[1] There were certain other provisions of the law relating to the blending of wheat flour with non-wheat ingredients and forbidding false labeling, with which the millers were in thorough accord, but on the whole they were much dissatisfied.[2] They felt that the law placed too much power in the hands of the Secretary of Agriculture, to whose department enforcement was confided, and his chief chemist, Dr. Harvey Wiley. The latter, it was claimed, had publicly expressed his prejudice against white flour. Artificial bleaching, they contended, had not been proved to be harmful; they had invested large sums of money in bleaching apparatus because the public demanded white flour, and there should be clear and convincing proof of the harmfulness of the bleached product before it was proscribed by the Government.

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[1] Their reasons are discussed below, p. 239.

[2] *Northwestern Miller*, October 21, 1898, p. 696; October 28, 1898, p. 740.

[3] *Ibid.*, December 26, 1906; Ladd and Stallings, 'Bleaching of Flour,' North Dakota Agricultural Experiment Station, Bulletin 72, pp. 219–35.

[4] Hale, *The Bleaching of Flour*, 7.

[5] Snyder, 'Flour Bleaching,' Minnesota Agricultural Experiment Station, Bulletin III, 101–43; Kozmin, *Flour Milling*, 485–88; Alway, 'The Effect of Bleaching upon the Quality of Wheat Flour,' Nebraska Agricultural Experiment Station, *Bulletin*, 1907.

For several years the Government confined itself to enforcing the requirement that all bleached flour be so labeled. The agitation against the product, however, continued. A number of States passed laws absolutely barring bleached flour. In 1910 appeared a study by Hale, of the United States Public Health Service, giving the result of numerous experiments which showed, apparently, that a deleterious action resulted from artificial bleaching, not only from the lessened digestibility of the flour, but because of the presence of small amounts of nitrites.[3] The Government then undertook to bar the bleached product from interstate commerce. When a shipment of the Lexington Mill and Elevator Company, of Lexington, Nebraska, was seized in April, 1910, in Missouri by Government inspectors, the Millers' National Association made a test case of the matter.[4] They admitted that bleaching caused the introduction of small amounts of nitrites into the product, but contended that the quantity was so small that there was no reasonable probability of its being harmful to the health of the consumer. The presiding judge ruled that it was not necessary for the prosecution to show actual harmfulness in the resulting product; the mere presence of poisonous substances, no matter how minute the quantity, was sufficient justification for barring the flour from interstate commerce. The case was therefore decided against the millers, but was appealed to higher courts. In 1914 the Supreme Court decided the case in favor of the defendants, holding that proof of the injurious effects from the use of bleached flours was essential.[1]

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[1] *Northwestern Miller*, October 31, 1906, p. 298.

[2] *Ibid.*, November 7, 1906.

[3] Hale, *The Bleaching of Flour*, 39.

[4] *Northwestern Miller*, February 25, 1914, p. 447.

The present position of the department is indicated by its statement of July 31, 1920: 'Bleached flour may be shipped within the jurisdiction of the Food and Drugs Act on condition that the bleaching has not impaired the quality or strength of the article or concealed damage or inferiority, and then only if branded plainly to indicate that it has undergone a process of bleaching.'[2] As to the States it may be said that about half the States have no laws on the subject. Wisconsin and North Dakota, which had barred bleached flour altogether, have since 1923 amended their statutes to conform to the national law. The remainder have a variety of legislation, about the only point of agreement being that the bleached product must be so labeled. Some States provide also that, if bleaching has impaired the quality or strength of the flour, or concealed damage or inferiority, it shall be regarded as adulterated and be barred from sale. In a few States the label must show the agency used in bleaching; e.g., 'Bleached with Nitrogen Peroxide' or 'Bleached, Chlorine Used.'[3]

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[1] United States Department of Agriculture, Bureau of Chemistry, *Service and Regulatory Announcements*, (1920), gives the final decree of the Supreme Court in full.

[2] United States Department of Agriculture, Bureau of Chemistry, *Service and Regulatory Announcements*, no. 26, (1920) p. 21.

[3] *Millers' Almanack* (1923), 125–27, summary of State Bleaching Laws. *Northwestern Miller*, August 27, 1923, p. 899: 'The bleaching of flour is now permissible practically everywhere in the United States; the continuation of this permission depends on the good faith of the millers themselves.'

During the period when the anti-bleaching agitation was at its height many of the larger mills abandoned the process. Since 1919, however, many of them have come back to it.[1] In recent years there has been a revival of the agitation, in part supported by bakers, who claim that the process is being used to conceal damage or inferiority and to 'lift' flours above their natural grades.[2] It has been claimed also that the process is harmful because it eliminates the vitamins from the bread, so making it less valuable as food.[3] Some millers have been experimenting with a plan of placing vitamin concentrates in bread, but without great success.[4] The agitation has extended to other countries as well. In England a committee of the Ministry of Health has reported in favor of continuing to permit bleaching, though the millers should be compelled to inform the public of the fact and the nature of the chemicals used. In addition the use of certain processes should be forbidden.[5] In France the use of bleaching processes is defended by the director of the laboratory of the Institute of Agriculture, who argues that, while experiments seem to show a loss of Vitamin A, the bleaching process is desirable in that it attenuates the enzymes which are a factor in the acidification of the old flour. Even if certain harmful materials are formed as a result of bleaching, the quantity is too small to endanger the health of the consumer, and the loss of Vitamin A is not serious, since it is found in so many other foods.[6] In any case there is no one complete food.

It seems safe to say that the recent agitation has caused very few mills to refrain from bleaching. The millers claim that the public demands a whiter flour than anything but artificial bleaching will produce. The process eliminates a long and expensive ageing. The deleterious effects, if any exist, are so slight as to make little impression on the consumer.[1] It may be that the public would be benefited if all bleaching were discarded, and there is, of course, the probability that the process is occasionally misused. It is possible that the public, or at least many individuals, would be better off if white bread were given up entirely. But it is hardly fair to ask the millers to undertake the long and expensive task of educating the public to the point of adopting this view. The bleaching process has probably come to stay.

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[1] Edgar, *The Medal of Gold*, 246.

[2] *Northwestern Miller*, July 27, 1921, p. 405.

[3] *Ibid.*, April 28, 1926, p. 377.

[4] *Ibid.*, June 13, 1923, p. 1171.

[5] *Ibid.*, March 30, 1927, p. 1284.

[6] *Ibid.*, April 28, 1926, p. 377.

Closely allied to the agitation against bleaching was another, which was opposed to all white flours on the ground that they were lacking in real food value. The modern flours, it was held, were too finely ground; the elimination of the bran made the flour less nutritious and less richly flavored, besides destroying the vitamins of the wheat. 'All the elements [are] taken off which go to make for the upbuilding of the human body [so that] two loaves of it is about equal to a pound of candy [in food value],' Dr. R. S. Copeland, Commissioner of Health for New York City was quoted as saying.[2] But the millers remain staunch defenders of white flour. The bran is too indigestible to be used as human food, says Harry Snyder, of the Russell-Miller Company. It 'is neither economical nor physiologically efficient to include bran as a component part of flour. White flour has a higher degree of digestibility and higher food value without the bran.'[3] Whole wheat may contain more proteins than white flour, but 'leather contains more proteins than beefsteak and sawdust more calories than starch.'[4]

The same spirit actuated the millers in their fight against adulterated flour shortly after 1890. Complaints of flour adulteration go back to colonial times, but the practice seems to have been especially prevalent in this decade. Beginning with the comparatively harmless practice of mixing corn-flour with wheat, some of the mills in their endeavors to cut their costs proceeded to use 'a by-product of glucose or starch' to such an extent that it composed sometimes as high as forty or fifty per cent of the flour-volume.[1] In 1897 and 1898 the Millers' National Association succeeded in securing prohibitive legislation against this evil and the Pure Food and Drugs Act of 1906 brought the fight to a finish. In that law it was provided that flours not made exclusively of wheat must be branded as 'Blended' and show the proportions of the different kinds of grain in its contents, as, for example, one third wheat flour and two thirds rye. Compounds must also show on the package what they contain, as, for example, flours containing baking powder. Imitations must show the character of the ingredients and state the fact that the compound is put up to imitate flour.[2] When in 1918 it was proposed that Congress suspend this law in order to conserve our wheat supply, the millers fought the idea immediately. They were willing to mill substitute flours as well as a 'hundred per cent extraction' of wheat (calling it 'Victory' flour); they were willing to instruct the housewife how to mix the various flours in order to secure a nutritious — if not very palatable — loaf. But they were 'unalterably opposed to any repeal or suspension of the law known as the Mixed-Flour Law.'[3]

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[1] Bailey, *Chemistry of Wheat Flour*, 214–15, states that 'the effect of bleaching on digestibility is too slight to merit consideration,' and that 'the concentration of nitrites or nitrous acid in bread is so low that enormous quantities must be ingested to introduce a significant amount of toxic material. . . .'

[2] *Northwestern Miller*, March 1, 1922, p. 943.

[3] *Ibid.*, September 10, 1919.

[4] *Ibid.*, September 2, 1925, p. 1003.

IV. Diversification of Products

It was not until after 1900 that the grinding of non-wheat flours was undertaken by the larger milling companies. The colonial mills, as we have seen, combined wheat- and corn-milling to a marked degree, since both flour and corn-meal were important exports.[1] As milling developed in specialized wheat-growing regions there came a tendency to specialize in wheat flour, though the Southern mills continued to grind much corn-meal. In 1884 *The American Miller* criticized its constituency on their devotion to wheat-milling to the exclusion of other grains. There was money to be made in grinding oatmeal, buckwheat flour, rye flour, and corn-meal as well.[2] The difficulty was that new methods of milling had developed specialized machinery suited only to wheat-flour milling. When certain milling companies grew so large that they could devote a whole milling unit to the making of such flours, that step was finally taken.

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[1] United States Industrial Commission, *Report on Transportation*, IV, 240, testimony of Frank Barry, Secretary of the Millers' National Association.

[2] *Northwestern Miller*, October 31, 1906, p. 298.

[3] Resolutions of the Millers' National Federation passed August 30, 1918.

At Minneapolis, for example, while there were small custom mills supplying such products for the local market at an earlier date, it was not until 1900 that one of the larger milling companies ventured into the field. In that year the Pillsbury Company put in an oatmeal mill and soon after they started the manufacture of a breakfast food also.[3] Both enterprises were short-lived, for a year or so later they were absorbed by a combination, and this by the Quaker Oats Company.[4] Why the millers should have been so slow in going into these fields has been partially explained above. The millers were, moreover, at war with the manufacturers of breakfast cereals. The latter were putting out advertising in which they claimed that their products were so far superior to white bread in palatability and food value that bread would soon disappear from the ordinary man's diet. The millers retaliated by securing scientific analyses of the breakfast foods in order to expose the exaggerations in their advertisements. Had the millers gone into the manufacture of breakfast foods under such conditions, they would have put themselves in a false position. It is only in recent years, after this early controversy had been forgotten and the breakfast-food industry securely established, that newer mills have been built which, from the start, have combined the two lines of business.[1] Since then, apparently, all the larger companies have engaged in the manufacture of breakfast cereals, although it was not until 1923 that the Washburn-Crosby Company definitely entered the business with a line of Gold Medal cereals manufactured in their new cereal mill in Chicago.[2]

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[1] See above, Chapter I.

[2] *American Miller*, XII, 361.

[3] *Northwestern Miller*, September 26, 1900, p. 635.

[4] *Modern Miller*, April 20, 1901, p. 14; *Moody's Manual, Industrials* (1919), 1688.

Why the millers should have been so dilatory in starting the manufacture of other than wheat flour is even less clear. The Washburn-Crosby Company for years bought rye flour from small custom mills to supply those of its customers who demanded it. By 1908 they were selling enough rye flour to keep busy a mill of eight hundred barrels' capacity and therefore decided to equip a mill of their own.[3] This, C. M. Edgar says, was considered an experiment at the time and their rye mill seems to have been the only one operated by the larger companies until the Great War. The general rise in food prices at that time, together with the increased foreign demand for corn, rye, and barley flour, stimulated their manufacture. At the same time the public began to manifest an increased liking for graham, whole-wheat, and entire-wheat flours. The Food Administration Regulations of January, 1918, which compelled the purchase of a pound of 'substitutes' (i.e., corn-meal, barley, or rye flour, or oatmeal) for every four pounds of wheat flour, increased this demand still more. As a result there was a large increase in the milling capacity devoted to other-than-wheat flours. For example, the Washburn-Crosby Company built a thousand-barrel rye mill at Minneapolis in 1914, at the same time adding to the capacity of their original rye mill. In 1916 they purchased the old North Star mill, using it at first to grind rye flour and later for making graham flour and also dairy and poultry feeds. In 1917 and 1918 the demand for corn-meal was so great that the company leased or built no less than five corn-meal mills in various parts of the Central West, though only one of these was to prove a permanent addition to their plant.[1] In the same way the Pillsbury Company purchased the old Phœnix mill in Minneapolis in 1916 and devoted it to rye-milling. This period has also seen the rise of a considerable group of durum mills as well. Thus there has been an increasing diversification of products, though wheat flour is still overwhelmingly the most important product of the mills. The developments in Minneapolis listed above are typical of what has taken place at other milling centers, though the net results vary greatly with local conditions. The Wisconsin mills, because of local supplies of raw materials and a local demand for the product, have emphasized rye-milling in recent years; in Louisville and Nashville corn-milling has been very important, in St. Joseph, pancake flours, in Evansville, cake flour, in the Southern centers there are many blending plants; and on the Pacific Coast one company operates a rice mill in connection with its other plants. With all of these companies, however, the wheat flour is the main product and all else is subsidiary to it.

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[1] Such as the Clarx Cereal Mill and the plant of the United States Cereal Mills Company at Minneapolis.

[2] Edgar, *The Medal of Gold*, 344–47.

[3] *Ibid.*, 254–55. This was a unit of their A mill at Minneapolis.

V. DURUM WHEAT AND THE NORTHWESTERN MILLS

The last of the principal wheat types, commercially speaking, to be developed in America was durum. Because it is grown in the spring-wheat area, and is sown in the spring, it is often classified with the spring wheats. In fact, however, it is a new kind of wheat differing radically from the common wheats so far discussed.[1] Samples of Russian-grown durum are said to have been brought to this country by the Department of Agriculture as early as 1864, but being tested under conditions of soil and climate to which they were not suited, they did not prove successful and were soon dropped. In 1898 an expert cerealist of the Department, searching in Russia for a drouth-resistant wheat suitable for the dry-farming region of the Great Plains, brought back some durum of the Kubanka variety.[2] After having grown it experimentally for a few years, the Department began to distribute it to farmers in the Northwest in 1900.[3] In 1901 some sixty thousand bushels were raised, in 1903 six or seven million bushels, and in 1906 over fifty million. Since the market did not expand proportionately, there was a rapid fall in price, which discouraged production for a few years. In addition there was a partial crop failure in 1910 and 1911.[4] Since those years the crop has averaged about fifty million bushels a year.[5]

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[1] Edgar, *The Medal of Gold*, 254–55, 310–11. The mills were at Minneapolis where a part of the C mill was converted to corn-milling, at Louisville where a new plant was erected and at St. Joseph, Missouri, Peoria, Illinois, and Clearing, Illinois, where plants were leased. Soon after the armistice the leases were given up and the C mill changed back to wheat-milling.

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[1] The classification of wheats given at the beginning of Chapter III is the commonly accepted commercial one. A scientific classification based on botanical relationships shows the relation of durum to the other wheats as follows:

(1) Common Bread Wheats (*Triticum Vulgare*)
  a. Soft winter, red and white
  b. Hard winter, red
  c. Hard spring
(2) Club or Squarehead (*Triticum Compactum*)
(3) Durum (*Triticum Durum*)
(4) Emmer (*Triticum Dicoccum*)
(5) Spelt (*Triticum Spelta*)

(Rutter, *Wheat Growing in Canada*, 40–42; Montgomery, *Productive Farm Crops*, 109–11.)

[2] Salmon and Clark, *Farmers' Bulletin*, no. 534, 5–6.

[3] Ball and Clark, *Farmers' Bulletin*, no. 680.

[4] *Ibid.*

[5] Durum Production in Minnesota, the Dakotas and Montana, 1917–26 (in thousand bushels):

1917	26,009	1922	85,280
1918	50,235	1923	46,618
1919	30,996	1924	62,373
1920	41,954	1925	61,651
1921	53,599	1926	44,826

(*Millers' Almanack* (1927), 184.)

The first distribution of seed was made in eastern North Dakota and that region has come to be the center of the durum area. The wheat thrives in high altitudes, for it needs a clear, dry atmosphere and intense heat in the latter part of the growing season. It grows best in rich black soils which receive but little rainfall, hence is especially suitable for dry-farming regions. Because of its early maturity it usually escapes the black-stem rust. Since its yield per acre is greater than that of common spring wheat, and the wheat is very hard and rich in gluten, it has many advantages over the older varieties.[1]

In spite of these advantages the millers strongly opposed the introduction of durum wheat. *The Northwestern Miller* was filled with fulminations against the 'goose-wheat,' as it was called. The only market for it was in France and Italy, where it was being used to make macaroni, spaghetti, and other edible pastes. It would not make a good bread-flour, they said, being too dark and forming a sticky dough, which did not bake well and was too hard to handle. In addition the wheat cost more to mill because of its extreme hardness and the flour yield per bushel was smaller than for good spring wheat.[2] Since there was little demand for the wheat, except for export, the price was bound to be lower than that of spring wheat. Meanwhile the millers were finding it increasingly difficult to get adequate supplies of the standard varieties. If this continued, the millers must get Canadian wheat or shut down their mills.[3]

There seems some ground for saying that the spring-wheat millers were injured in the export flour market by the spread of durum-growing and the publicity given to the controversy over it. The English buyers, especially, felt that the quality of the spring-wheat flour exported to them was suffering from the mixing of durum with common spring wheat.[1] The decline in the output of Fife and Marquis wheat did constitute a serious problem for the millers, as has been shown. But the farmers of the Dakotas continued to grow the durum and gradually found a market for it. The foreign demand for it increased, especially during the Great War when the Russian supply was cut off. In this country our increasing population of immigrants from southern Europe demanded larger supplies of macaroni and spaghetti and caused the erection of large factories for their manufacture.[2] These factories used the durum in the form of a coarse granular product called semolina, and mills had to be created to mill it. And, lastly, though the Northwestern millers could not make a good flour out of durum, the soft-wheat millers farther east discovered that they could make a very satisfactory bread-flour by mixing durum with soft-wheat flours.[3]

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[1] Salmon and Clark, *Farmers' Bulletin*, no. 534, 5–7, 15; Rutter, *Wheat Growing in Canada*, 17, 73–74; *Northwestern Miller*, November 1, 1922, p. 513.

[2] Salmon and Clark, *Farmers' Bulletin*, no. 534, 15; *Northwestern Miller*, April 10, 1907, p. 93.

[3] *Northwestern Miller*, April 10, 1907, p. 93.

As a result of this growing demand the spread between durum prices and those of hard-red-spring wheat gradually decreased. When the Government fixed the price of wheat during the Great War there was no difference in the stabilization price. In general durum prices run only slightly lower than those of hard-red-spring in normal times.[4] Since the yield per acre is normally greater and the crops safer in regions subject to drouth, one can hardly blame the farmers for increasing the durum acreage as they have done.

The difficulty is that durum is growing at the expense of more valuable and desirable wheats. In the four leading spring-wheat States the durum crop doubled its percentage of the production in the years 1917–21, while Red Fife, on which the millers of the region made their reputation, has almost disappeared.[1] In North and South Dakota almost half the wheat acreage in 1926 was durum.[2]

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[1] Davis, *Flour and Wheat Trade* (1909), 8.

[2] *Northwestern Miller*, November 1, 1922, p. 513.

[3] Salmon and Clark, *Farmers' Bulletin*, no. 534, 13.

[4] That is the amber durum which is best suited to making macaroni. The red durum uniformly sells at a considerable discount.

Most of the crop goes East by way of Duluth and the Great Lakes, to be ground into flour and mixed with soft-wheat flours to some extent, but mainly to be exported to southern Europe. In this trade American durum must ordinarily compete with supplies from northern Africa and Russia which are indeed superior in quality.[3] But since Russia has been exporting very little in recent years, American growers have been able to export larger quantities than may be possible when normal conditions are restored. Even as it is, American exports are handicapped by the fact that a large proportion of our crop is so mixed with common wheat or inseparable weed seeds as to be unfit for grinding into semolina for macaroni-making.[4]

The consumption of durum products has increased to the point where perhaps two million barrels of semolina are now required annually, most of which is produced by a relatively few mills specializing in durum products, the largest of which are located in the Northwest. In Minneapolis the Nokomis mill of the Minneapolis Milling Company was originally built as a durum mill. Washburn-Crosby and Pillsbury each have milling units devoted to durum-grinding. The Commander group of mills includes, besides the Nokomis, a durum mill at Stillwater, and one is operated in St. Paul by the Capital Flour Mills Company. These, with a durum mill belonging to the King Midas Company and a unit operated by the Duluth-Superior Milling Company, constitute about all the durum mills in the Northwest.[5]

Many other Northwestern millers have experimented with this grain, since, as before stated, it is cheap, is rich in gluten, and requires no special machinery to grind into flour. The general opinion is that the product is unreliable as flour and the market very limited. Very little flour made from straight durum wheat is produced or sold.[1] Hence the turn to semolina by those mills which grind durum at all. Probably fifteen thousand barrels represents the total capacity of the durum mills of the United States, of which perhaps one half or two thirds is in Minneapolis territory. Collectively they grind not more than ten million bushels of durum annually. The other four fifths of the crop must be exported.[2] The production of macaroni and allied products, however, is increasing, an export market is being developed at the same time that the domestic demand increases rapidly; thus there still seem possibilities of future expansion for the durum miller.

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[1] United States Department of Agriculture, *Yearbook* (1921), 530.

[2] *Millers' Almanack* (1927), 184.

[3] Davis, *Flour and Wheat Trade*, 109–12.

[4] *Northwestern Miller*, November 1, 1922, p. 513.

[5] *Ibid.*, April 29, 1925, p. 460; June 16, 1926, p. 1063; March 8, 1922, p. 1048.

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[1] The Duluth-Superior Milling Company is the only one which, so far as the writer is aware, advertises a 'patent' made from durum wheat. Bailey (*The Chemistry of Wheat Flour*, 19) shows that experiments have demonstrated that durum, while running very high in test weight per bushel, does not mill freely and gives only a low flour yield. The flour made from it makes a poorer showing in the baking test than either hard-red-spring or hard-red-winter, as its loaf volume is smaller and its texture poorer.

[2] *Northwestern Miller*, November 1, 1922, p. 513.

CHAPTER IX

ASSOCIATIONS IN THE MILLING INDUSTRY

I. Unionization of the Flour-Mill Workers

Excepting the coopers and the millwrights, none of the flour-mill workers belonged to that artisan class from which our earliest trade unions sprang. Moreover, the millwrights usually belonged to a millwrights' union which contained many members who were not flour-mill employees, while the coopers were not directly employed by the mills. As a result the organization of trade unions in the mills has been a relatively recent development. In Minneapolis we hear of a coopers' strike as early as 1870 and again in 1872.[1] But the first concerted action by the flour-mill employees did not come until 1879. At that time the mill-owners had been planning to reduce wages, but when the men heard of it they banded together to refuse the reduction. The owners had to give way. Some of the owners indeed said that they had been opposed to a wage reduction from the first.[2] There was no union as yet of mill employees, though they did organize a sick-benefit and accident society of which the millers seemed to approve, inasmuch as the men disclaimed any intention of making it a union.[3] Throughout the eighties wages remained unchanged despite falling prices. Moreover the men were given steady employment. Consequently, there was little friction between employers and employees. But the hard times of the early nineties brought labor troubles, in Minneapolis at least. There the workers seem to have been organized into three separate craft unions: (1) the flour-loaders, (2) the packers and nailers, and (3) the mill-operatives. The last group included most of the skilled workers. In August, 1891, the packers and nailers went on a strike demanding an increase of wages that would put them on a parity with the mill-operatives. The mill-owners at first refused to grant the increase, but, as it was the busy season, were forced to yield. They gave the increase demanded and the men went back to work, none of them having been out more than half a day.[1] Since some of the mill-owners were dissatisfied with the result, friction between owners and employees seems to have continued. *The Northwestern Miller* was inclined to blame the employers for unnecessarily rigid discipline. Some of the mill-owners seem to have experimented with a piece-work plan, working the men in groups consisting of two nailers and a packer, but without success.[2]

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[1] *Minneapolis Tribune*, September 25, 1870; *ibid.*, May 11, 1872. The Minneapolis coopers during this period undertook a very interesting and successful experiment in producers' coöperation. See Shaw, 'Coöperation in the Northwest,' *Johns Hopkins Studies*, Sixth Series, VI, and Virtue, 'The Coöperative Coopers of Minneapolis,' *Quarterly Journal of Economics*, XIX (1905), 527–44.

[2] *Northwestern Miller*, May 2, 1879, p. 270, and editorial, p. 279.

[3] *Ibid.*, p. 266, 270.

The millers seem to have suffered from the hard times of 1893 and in the fall of that year there was an agitation among them for a concerted reduction of wages. *The Northwestern Miller* opposed this. Considering the irregularity of employment, the workers were getting little enough as it was. A reduction in wages by the local mills would result in similar reductions elsewhere. The millers would not be benefited and the workers would lose. 'The maintenance of the preëminence of America as a flour producer does not lie along the line of action which contemplates the reduction of the operative miller from his present condition of high intelligence and fairly well-repaid effort to one of a common ill-repaid hireling.' [3]

About this time the local unions of flour-mill employees seem to have affiliated with the Knights of Labor. In the following June there was a strike at the Washburn-Crosby plants. Sacks were coming in to replace barrels at this time.

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[1] *Northwestern Miller*, August 21, 1891, p. 268.

[2] *Ibid.*

[3] *Ibid.*, November 10, 1893, p. 671.

The company put a lot of the men to work filling sacks instead of barrels and cut the wages, alleging as an excuse the small amount of skill required to do this in comparison with packing in barrels. When the strikers left, their places were filled with non-union men. The Knights of Labor then attempted a nation-wide boycott of Washburn-Crosby flour, though, apparently, without much success.[1]

Soon after this unsuccessful strike, the mill-employees seem to have reorganized into unions which affiliated with the American Federation of Labor. The mill-operatives formed an organization called the Northwestern Flour Mill Employees in 1895; the packers organized a union of their own in 1899, and the loaders did the same in 1900.[2]

The period from 1897 to 1903 was one of very rapid growth in American unionism.[3] Flour-mill employees caught the general enthusiasm. Locals were formed in the smaller Minnesota centers such as Anoka, Faribault, and Mankato, and a little later at Hastings, Montgomery, and St. Cloud.[4] In the East unions were formed by flour-mill employees at Buffalo, Niagara Falls, and Syracuse.[5] We hear also of local unions at Chicago, at Kansas City, and throughout the Kansas area.[6] In October, 1902, the Minneapolis mill-operatives' union had asked for the institution of the eight-hour day without a decrease in daily wages. The mill-owners were at first disposed to refuse, claiming that the eight-hour day existed in no other milling center and that its institution at Minneapolis alone would put that city to a great disadvantage. To this the men replied that, since the Minneapolis mills were the greatest in the country, they ought to take the lead in instituting reforms, being confident that the other mills would soon follow. The Minneapolis millers finally granted the eight-hour day with a slight wage-cut and their example was soon followed by the leading mills in the smaller centers.[1] To hold and extend these gains the Minneapolis unions then took the lead in organizing the International Union of Flour and Cereal Mill Employees with a membership in the American Federation of Labor. During the last months of 1902 and the spring of 1903 almost every number of *The Northwestern Miller* chronicled the formation of new locals of the international: for example, at Winona and Hastings, Minnesota; at Petersburg, Indiana; Nashville, Illinois; Yorkville, Michigan; and Nebraska City, Nebraska.[2] In some cases these unions were newly organized, in others existing locals directly affiliated with the American Federation of Labor were taken over.[3] While the organization was strongest in the Northwest, it seems to have been well represented in all sections of the country. The reaction of the Kansas millers to it is stated as follows: 'Many mill-owners in Kansas anticipate that the union movement will extend from Minneapolis generally throughout the West and that they will be compelled to decide the hour and wage question through unions before long, but the mills of Kansas are of so small capacity for the most part, and so scattered that there seems extremely little cause for apprehension.'[4]

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[1] *United States Miller*, June, 1894, p. 104.

[2] Minnesota Bureau of Labor, *Eighth Biennial Report* (1901–02), 456.

[3] Barnett, 'Growth of Labor Organizations in the United States, 1897–1914,' *Quarterly Journal of Economics*, xxx, 844 (1916).

[4] Minnesota Bureau of Labor, *Biennial Reports*, 1901–02 to 1907–08.

[5] New York Department of Labor, *Twentieth Annual Report of the Bureau of Labor Statistics*, 798.

[6] *Northwestern Miller*, November 19, 1902, p. 1057.

The success of the international union was short-lived. Its strength lay in the Minneapolis locals, which contained perhaps two thirds of its members.[5] These managed in 1903 to get into a disastrous strike which completely broke their power. In the same year there was also an unsuccessful strike of the unions at Chicago. As a result there was a rapid decline in the membership of the International after its initial success. The Minneapolis strike arose out of the fact that the grant of an eight-hour day in 1902 applied only to the mill-operatives. In July, 1903, the flour-loaders asked for the eight-hour day also. Their request was refused. They repeated it on September 14th, and it was again refused. They then consulted with the International Union officials and also secured the support of the mill-operatives' union and of the packers' union. Thus, the movement had the support of the greater part of the mill employees.[1] The loaders claimed that it was only just that they have the same length of day as the other employees. The employers claimed that they had just given the loaders an increase in wages, and that two dollars for eight hours' work was an exorbitant demand. The Washburn-Crosby Company had hired a number of girls for the work of filling and sewing the smaller packages, paying them a dollar a day, and the men felt that these girls should get the same pay as the men packers.[2] There seems to have been some friction between the employers and the union officials, so that the employers, resentful at what they felt was unwarranted interference with their business, refused to deal with the union officials and seemed bent on provoking a strike.[3]

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[1] *Northwestern Miller,* October 1, 1902, p. 683; *ibid.*, October 22, 1902, p. 840; September 2, 1903, etc.

[2] *Ibid.*, April 15, 1903, p. 767.

[3] As at Topeka, Kansas. *Northwestern Miller,* November 19, 1902, p. 1057.

[4] *Ibid.*

[5] In 1901–02 the three Minneapolis unions claimed a combined membership of 1278; in 1903, the first year of the International, it claimed a membership of 2100.

Having called in the International Union officials, the men on their advice offered to arbitrate the matter, with the understanding that, if arbitration was refused, a strike would be declared. The mill-owners rejected the proposal, claiming there was 'nothing to arbitrate.' As a result, on September 24th, seventeen mills belonging to Pillsbury-Washburn, Washburn-Crosby, and the Northwestern Consolidated Companies were forced to close. The smaller mills were not disturbed, but their owners were told that they, too, would be closed if they attempted to fill any orders for the big mills. It was understood that they would accept any agreement forced on the big mills, and the strikers hoped that, if the small mills ran to full capacity, they might get many orders which would otherwise go to the big companies, and that the knowledge of this would tend to weaken 'the big three.' [1]

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[1] *Northwestern Miller*, September 16, 1903, p. 621.

[2] *Ibid.*, September 23, 1903, p. 673.

[3] Minnesota State Federation of Labor, *Twenty-Second Convention Report* (1904), 14.

The striking employees included 500 packers and nailers, 375 loaders, and 630 mill-operatives out of 1934 men employed. Not all of these belonged to the union, many non-union men being forced to strike with the rest by pressure of public opinion.[2] Only the millwrights, machinists, electricians, and a few others remained at work. The millwrights had a union and were affiliated with the American Federation of Labor, but not with the International Union of Flour and Cereal Mill Employees. Their union had refused to strike, but there were rumors that it, too, would be called out if the strike was not speedily settled.[3]

The mill-owners seem to have been surprised at the strength of the movement, but soon organized and determined to fight it to a finish. The strikers again proposed arbitration and asked the mayor to appoint a committee of five citizens to offer mediation. This was done, but the mayor's offer was rejected by the committee of mill-managers who directed the strike. The mill-owners once more stated their position, that the strikers' demands were unreasonable, that they were paying the highest wages of any millers in the world, and that flour profits were too low to allow the increase. They claimed, too, that, when the eight-hour day had first been instituted in the mills, the unions had promised to force competing outside mills to accept it also, but that they had failed to do so.[4]

Some of the seventeen mills closed by the strike were reopened almost immediately. By bringing together in one plant the scattering few who remained faithful, by impressing into service office men and university students, each company succeeded in starting some of its mills. The first day they operated six and a half out of the seventeen mills.[1] The strikers picketed the mills so strongly that the millers found it difficult to bring in strike-breakers or to hold them after they had been brought in. They took possession of the Pillsbury oatmeal-mill building, which was unoccupied at the time, and fitted it up as a barracks, when the restaurants and hotels refused to feed the strike-breakers.[2] The open court between the two rows of mills was closed by a high fence so that the strike-breakers might have space for open-air exercise. At the start the strike was quiet and orderly, though after the fourth week complaints of attacks on strike-breakers began to be heard.[3]

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[1] *Northwestern Miller*, September 30, 1903, p. 927.

[2] *Ibid.*, 727. [3] *Ibid.* [4] *Ibid.*

The strikers fought with grim determination, but the millers gradually increased their crews, and, as these became better trained, the production of the mills increased. The strikers were given financial assistance by the other unions of the city, and there was talk of a sympathetic strike of the railway switchmen and other unions. The millwrights' union offered financial aid, though it was not willing to strike.[4] In the third week of the conflict, the president of the International Union, who was directing the strike, became discouraged and advised the men to return to work. There were rumors that he had sold out to the millers, and after a stormy meeting, the men rejected his advice, and new officers took charge.[5] A national boycott of the products of the Washburn-Crosby Company[6] was instituted by the American Federation of Labor to aid the strikers, but their cause was already lost. A month after the strike had begun only one mill was idle and the volume of production for the mills as a whole was almost back to normal.[1]

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[1] *Northwestern Miller*, September 30, 1903, p. 727.

[2] *Ibid.*, October 14, 1903, p. 837.

[3] *Ibid.*, October 21, 1903, p. 893.

[4] *Ibid.*, October 7, 1903.

[5] *Ibid.*, October 14, 1903, p. 837.

[6] That company was selected because its officers had taken the lead in the opposition to the unions. (American Federation of Labor, *Proceedings of the Twenty-Third Annual Convention* (1903), 255.)

The failure of the strike ruined the Minneapolis unions. The men claimed afterwards that the millers refused thereafter to hire any man who belonged to a union and that they blacklisted the strike leaders. The locals kept up a nominal existence, and various efforts were made to revive them, particularly after the panic of 1907, but without success.[2] By 1916 *The Minneapolis Survey* could state with substantial accuracy that there was 'no trade organization of any kind in the mills.'[3]

As a result, there was a rapid decline in the membership and strength of the national organization.[4] By 1910 this was also moribund. The American Federation of Labor, as the result of an investigation of its affairs, revoked the charter of the national and the locals were once more connected directly with the Federation as federal local unions. These also decayed and disappeared, so that in Minnesota, for example, the State Labor Bureau found not a single union in the industry in the years from 1913 to 1916.

Then came the Great War with its labor unrest, increase in cost of living, and demand for democracy in industry as well as in government. The flour mills could not remain unaffected by these forces. Wages were increased materially

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[1] *Northwestern Miller*, October 2, 1903, pp. 891, 893.

[2] Conversations with union leaders.

[3] *Minneapolis Survey*, 322.

[4] American Federation of Labor, *Proceedings* (1910), 267; (1911), 197; (1912), 57.

Membership of the International Union of Flour and Cereal Mill Employees:

1903	2100	1906	700	1909	800
1904	2100	1907	700	1910	300
1905	900	1908	800	1911	300

(Barnett, Growth of Labor Organization in the United States, 1897–1914, *Quarterly Journal of Economics*, XXX, 844.

and rapidly,[1] but the unrest was not quieted. In Minneapolis, in 1917, the packers of the Washburn-Crosby Company struck for higher wages and the company was forced by the exigencies of the war to settle quickly. This started a unionizing movement and in a short time the majority of the Minneapolis mill-workers were unionized. This time they discarded the craft type of organization and adopted that of industrial unionism. The United Brewery Workmen, a militant industrial union organization, forced to seek new fields of activity by the growth of prohibition, had, in 1918, decided to extend its jurisdiction over the flour-milling and cereal trade, changing its name at the same time to International Union of United Brewery, Flour, Cereal, and Soft Drink Workers, under which name it was then rechartered by the American Federation of Labor.[2]

This organization, through its paid organizers, proceeded to make an active campaign to organize new local unions. In Minnesota such locals were established at Faribault, Montgomery, Mankato, New Ulm, New Prague, and Red Wing, and there was a scattering of locals in other States as well. But, just as in 1903, the main strength of the movement lay in the Northwest.

The mill-owners quite naturally looked upon the movement with disfavor. *The Northwestern Miller* made sarcastic comments on the unnatural union between the flour-mill

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[1] Wages (in dollars per day) paid in the Minneapolis mills, 1903, 1916, 1920:

	1903	1916	1920
Bolters and grinders	2.80	3.60	5.76
Smutters	1.80	1.92	4.64
Oilers	1.88	2.40	4.24
Sweepers	1.76	2.40	4.00
Packers	2.75	3.00 (9 hrs.)	5.04
Truckers	2.00 (10 hrs.)	2.50 (10 hrs.)	4.40
Loaders	2.00 (10 hrs.)	2.50 (10 hrs.)	4.40

All wages are for an eight-hour day unless otherwise specified.

(1903 — *Northwestern Miller*, October 21, 1903, p. 891; 1916 — *ibid.*, July 25, 1916, p. 228; 1920 — obtained from union representatives.)

[2] United States Bureau of Labor Statistics, *Handbook of American Trade Unions*, 139.

workers and the brewery men. It criticized the journal of the union because it was partly printed in German. It objected to the talk of peonage and slavery in their propaganda. The editor of *The Northwestern Miller* had known many of the mill workers personally for forty years and knew that they were 'satisfied with the conditions of their work and wages, and on excellent terms with their employers, between whom and themselves has always existed the utmost good feeling.'[1]

The millers combated the union in various ways. They organized shop committees consisting of representatives elected from each group of workers, such as the bolters and grinders, the nailers and packers, the truckers and loaders.[2] The Washburn-Crosby Company, and later the Pillsbury Company, bought group insurance for the men. Under these policies every Pillsbury employee, for example, after three months' service is insured for $500 and this is gradually increased until, at the end of five years, the policy amounts to $2000.[3] The companies also organized sick-benefit associations, provided cafeterias and made many other efforts to better working conditions in the mills.[4]

How far the unions succeeded in organizing the men it is difficult to say. The existence of the 'company union' clearly did not keep the men from joining the trade union. The millers did not recognize the union, but neither did they discriminate against union men.[5] The great gains in wages

[1] *Northwestern Miller*, October 15, 1919, p. 253.

[2] Washburn-Crosby Company, *Working Agreement for Employees Committees*. Somewhat similar systems were worked out by the Pillsbury Flour Mills Company and the Russell-Miller Company. (*Northwestern Miller*, March 17, 1926, p. 1078 ff.)

[3] *Carry-On*, edited by the employees of the Pillsbury Flour Mills Company, February, 1920, p. 3.

[4] *Northwestern Miller*, March 17, 1926, p. 1078.

[5] At least so they claim. One of the larger companies, however, has been accused of maintaining a system of spies in its unions and shops and there seems to be a good deal of fear upon the part of the employees, so that it is difficult to get them to talk freely. (See Robert W. Dunn, 'Company Unions,' in Laidler and Thomas, *New Tactics in Social Conflict*, 109.

and working conditions were made before the union was fully organized,[1] nor did the latter show any strength in the period of depression (1920–21) that followed the Great War. Without any active conflict the union seems to have fairly melted away. In 1919 they had claimed 1625 members in Minneapolis alone; in 1920 their national membership was estimated at 1000; in 1923 at 800.[2] The causes of this decline are quite obscure. Doubtless the business depression, unemployment, and a feeling of helplessness and disillusionment caused many a member to withdraw. In addition there seems to have been internal dissension, a distrust of the leaders, and a lack of good leadership. Warring nationalities among the members contributed to the lack of unity. The 'company union' seemed to be quite equal to taking over the functions of the trade union; the amalgamation with the brewery workman displeased many.[3] At any rate, by 1926 it was once more substantially true that union organization was practically non-existent in the Minneapolis mills and no longer important anywhere in the industry.

II. Trade Associations in the Milling Industry

Associations do not seem to have played a very important part in the milling industry. The individualistic attitude of the millers, the disparity in size of the mills, the extreme dispersion of the industry, all made it difficult to form effective organizations. The earliest local associations were probably formed at the beginning of the nineteenth century in the milling centers of the time, but there are no records of their history extant. Just after the Civil War we find small local district or regional organizations springing up wherever there was a reasonably large group of millers who had a common grievance to redress or foresaw a common advantage which they could attain by uniting. The movement was part of a nation-wide development affecting many other industries, for this was an era when trade associations were springing up on every hand. These earliest associations seem to have been formed primarily for the purpose of controlling wheat supplies in their immediate territory. Such was the Minneapolis Millers' Association, referred to above, which was founded perhaps as early as 1865.[1] In the following decade the millers of southeastern Minnesota formed an association for the double purpose of controlling wheat prices in that area and securing railroad rates to market which would be on a parity with those from Minneapolis.[2] Then, after the introduction of the new processes (after 1870) came a series of legal attacks on the millers by holders of patents, or patent-claimants, who demanded immense royalties from the millers on the purifiers and other new machines which they were using. This forced the millers to organize State and National associations to defend themselves against these 'patent-sharks.' The Iowa and Illinois associations were organized in 1873; Wisconsin millers formed a State association in 1875; those of Minnesota in 1876, of Ohio in 1877, of Pennsylvania in 1878.[3] These associations soon developed other aims and objects. (1) In many States they proceeded to organize mutual fire insurance companies to escape the very high rates charged by the commercial companies. (2) They attempted (without much success, however) to secure more favorable rates on flour as compared with wheat. (3) They held annual conventions at which the millers were enabled to get acquainted with each other, talked over their problems, and listened to formal addresses and discussions on matters of general interest to the trade; as, for example, the grading and inspection of wheat, the milling value of different varieties of wheat, and milling methods and milling machinery.[1] (4) Occasionally there was talk of combinations and other devices to curb too severe competition, especially to secure to each miller his local home market. On the whole, however, the State associations made little progress in this field, seeming to realize that it was a matter that could be more effectively dealt with in the smaller and more compact local organizations.

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[1] *Northwestern Miller*, March 17, 1920, p. 1256.

[2] Wolman, *Growth of American Trade Unions*, 89, 138.

[3] Based on conversations with union members.

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[1] *Northwestern Miller*, May 18, 1921, p. 769. See above, p. 142 ff.

[2] *Ibid.*, March 23, 1877. They announced their objects as: '(1) To unite in demanding cheap freight rates from Chicago east and (2) To unite in buying wheat along the line of the Southern Minnesota railroad as against speculators who buy only to sell again and not to manufacture into flour.' As to freight rates: 'All flour shipped east of La Crosse shall be shipped by, and in the name of the Association, and all rebates of freights secured by the Association shall be enjoyed equally by all members.'

[3] *Northwestern Miller*, October 13, 1876; December 8, 1876; December 27, 1878, p. 455; December 13, 1878, p. 417; July 19, 1878, p. 86; June 21, 1878, p. 22.

Meanwhile the patent fights had caused the organization in 1873 of the Millers' National Association. This organization took charge of the fight against the 'patent-sharks,' in which it was engaged almost continuously until about 1890.[2] As was the case of the State organizations, it rapidly expanded its programme, pressing the fight against lower freight rates on wheat than on flour especially,[3] and pushing a movement to secure uniform grades and methods of grading wheat in the principal wheat-growing States.[4] There seems to have been something of a movement to establish trading in flour futures at the principal markets, though the association never officially advocated it; and then the annual meetings of the association were given over to the discussion of topics of general interest to the trade similar to those discussed by the State conventions.[5] On the whole, the organization did not function very effectively. Membership was individual, dues were small, and the association was too weak structurally and financially to accomplish a great deal. The editor of *The Northwestern Miller* dutifully urged the millers to attend the annual conventions, but was openly skeptical of the results. 'In a business point of view, we don't expect the meeting will amount to much,' he said in 1876, 'for the fact is, a national convention of millers to unite on measures for the reduction of freights on flour, is not nor never will be practical, for the simple reason that what may be to the interest of the Millers of Minnesota and Wisconsin may *not* be to the interest of the Millers of Illinois and Michigan. But socially, and as a means of improvement, it is a grand thing. . . .'[1] The St. Louis millers seem to have taken the lead in the organization of the associations. Stanard (a prominent St. Louis miller) stated in 1878 that the association was formed 'to afford opportunities for millers to meet together and become acquainted with each other; for the purpose of receiving information in regard to growing crops, discuss methods of milling and talk about matters of mutual interest.'[2] For a time, also, the millers played with the idea of establishing a milling school or college.[3]

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[1] *Ibid.*, December 6, 1878, p. 40 (Indiana); August 30, 1878, p. 182 (Michigan); January 31, 1879, p. 65; June 21, 1878, p. 19 (Iowa).

[2] United States Industrial Commission, *Report on Transportation*, IV, 240, testimony of Frank Barry, Secretary of the Millers' National Association.

[3] *Northwestern Miller*, June 30, 1876; June 22, 1877.

[4] *Ibid.*, June 22, 1877.

[5] *Ibid.*, June 16, 1876.

After the patent-fights were ended, the national association seems to have languished. As a result there grew up an antagonism toward it, partly from those millers who wanted to build up our export trade and felt that the association was doing nothing to bring this about, and partly from the winter-wheat millers who felt that their interests were not being sufficiently cared for. *The Northwestern Miller* attempted unsuccessfully to organize an export association to be called the Millers' League of America (1890).[4] The winter-wheat millers were more successful in organizing the Winter-Wheat Millers' League in 1892.[5] During the following years there were, therefore, two national associations dividing the field. The older association gave itself over to internal problems, particularly the fight against adulteration in wheat flours and succeeded in securing repressive legislation from Congress in 1897 and 1898;[1] the latter was fully occupied with the problems of our export trade, which was then in a period of decline.[2]

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[1] *Northwestern Miller*, May 5, 1876.

[2] *Ibid.*, June 14, 1878, p. 1.

[3] *Ibid.*, April 18, 1878, p. 235.

[4] *Ibid.*, Holiday Number, 1890, pp. 2–3; July 17, 1891, p. 67.

[5] *Ibid.*, October 13, 1899, p. 738; November 1, 1899, p. 839.

During this period there were a number of efforts to establish regional associations intermediate between the State and National organizations, such as the Tri-State Millers' Association formed in 1890 by the millers of Ohio, Indiana, and Michigan.[3] The same causes brought about a revival of activity in the State associations. Many of these were reorganized with a paid secretary who devoted his full time to the work of the organization.[4] However, both State and regional associations felt the need of a strong national body. Consequently efforts were made to unite the two national bodies which resulted in 1902 in the organization of the Millers' National Federation.[5] This, as its name implies, is a delegate body made up of representatives of the various regional, State, and local associations. For a time it occupied itself with non-controversial matters on which it could get support from all millers throughout the country, such as: (1) attacks on discriminating flour freight rates, (2) demands that the railroads give better car and shipping service, (3) attempts to secure more liberal drawback arrangements from the Government on export shipments, and (4) advocacy of reciprocity arrangements with Canada, Cuba, and other countries.[6] In the following decade much attention was paid to such subjects as standardization of packages, uniform package price-differentials, and uniform sales contracts.[1] When the United States entered the War in 1917, the association became the point of contact between the trade and various departments of the National Government, particularly the Food Administration.[2] Although there was some conflict, particularly over the efforts of the Food Administration to bring about the suspension of the mixed-flour law (which the millers opposed),[3] and with the United States Shipping Board rulings, the relations of the trade with the Government were on the whole exceedingly close and friendly in this period.

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[1] *Northwestern Miller*, June 17, 1898; United States Industrial Commission, *Report on Transportation*, IV, 240. See also Chapter VIII, p. 240, for further discussion.

[2] See below, Chapter XI, p. 293 ff. for a discussion of export trade pro- in this period.

[3] *Northwestern Miller*, May 23, 1890, p. 541.

[4] *Ibid.*, May 15, 1891, p. 666 (Michigan Millers' Association).

[5] *Ibid.*, October 13, 1899, p. 738; November 1, 1899, p. 839; February 16, 1902, p. 386a; March 26, 1902, p. 634a.

[6] *Ibid.*, September 17, 1902, p. 579.

After the Great War new problems caused a reorganization of the Federation involving the development of a strong executive council and a well-paid staff of executive officers who are expected to devote all their time to the business of the organization. As now organized it is principally interested in building-up foreign markets through its export department, increasing domestic consumption of flour through an 'Eat-More-Wheat' advertising campaign, and increasing the miller's knowledge of his business. This last aim is to be attained through the adoption of a uniform system of cost accounting which the Federation has worked out and is trying to induce the millers to install, and the establishment of a bureau of statistics to gather, organize, and distribute to its members, statistics of output, shipments, prices, and stocks on hand.

The last two items seem to indicate a leaning toward open-price associations. The formation of such associations on a local or even regional basis has been strongly advocated before the Federation, though that body is not officially committed to such a movement.[4] Attempts to form such organizations seem to have been made as early as 1907–08 in southern Illinois and in Kansas.[1] In only a few local associations does the plan seem to have been fully developed, however.[2] Most of the State associations still concern themselves mainly with disputes with the railroads over carload minima,[3] the eat-more-bread campaign[4] improved flour-loading facilities at seaports,[5] milling-in-transit rates, the baking consolidations, which they look upon with some degree of fear,[6] and the milling-in-bond situation.[7] In general it would seem as if the divisive forces were stronger than those making for unity — at least on a national scale — so that one may expect the principal growth of the future to come in the local rather than the national organizations.

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[1] *Northwestern Miller*, June 18, 1902, p. 1230; April 14, 1920, p. 162.

[2] See below, p. 267.

[3] *Northwestern Miller*, September 14, 1918, p. 813. See below, p. 270.

[4] *Ibid.*, July 6, 1921, p. 55 ff.

III. Government Control during the Great War

Since, as we have shown, both the employers' associations and the unions were greatly influenced by Government control during the Great War, an account of that episode may well be given at this point. First of all we must consider the conditions which made such a system seem necessary. The opening years of the War had been prosperous ones for the millers. Exports, which had reached a low point in 1910, and in the following years had been rising steadily, now took a big jump.[8] Prices rose, millers found themselves unable

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[1] *Ibid.*, July 3, 1907, p. 32; May 13, 1908, p. 401.

[2] Nelson, *Open Price Associations*, 19, 74. See also the Federal Trade Commission Report, *Competitive Conditions in Flour Milling*, chapter III.

[3] *Northwestern Miller*, April 14, 1920, p. 163 (North Pacific Millers).

[4] *Ibid.*, May 5, 1920, p. 531 (Ohio Millers).

[5] *Ibid.*, April 14, 1920, p. 162 (Southwestern Millers' League).

[6] *Ibid.*, April 7, 1920, p. 53 (Southern Minnesota Mills).

[7] *Ibid.*, November 19, 1924, p. 730 (Southwestern Millers' League).

[8] United States flour exports, 1910–20 (calendar years, in barrels):

1910	8,370,000	1916	14,379,000
1911	11,258,000	1917	13,926,000
1912	10,622,000	1918	21,706,000
1913	12,278,000	1919	26,449,000
1914	12,769,000	1920	19,853,000
1915	15,662,000		

(*Millers' Almanack* (1926), 177.)

fully to supply the demand for their products.[1] It was a seller's market. There were, of course, some serious difficulties. Flour in store at ports in the warring countries was seized by the Governments, leaving compensation to be later determined. Shipments afloat in ships of the warring countries were seized by their enemies. Orders were cancelled; there was no market for foreign exchange for a time. After the hectic days of the opening of the War had passed, conditions continued abnormal because of high freight rates and transportation difficulties, because of Great Britain's interference with the shipments to neutral countries, and because of the definite closing of the markets in the countries of central and eastern Europe.[2]

It was not until 1917 that the world began to realize the definite danger of a food shortage in the Allied countries. Feverish buying both by the Allies and the neutral Governments absorbed all the wheat and flour they could obtain. Pessimistic crop reports and the fear of a prospective shortage caused a period of wild speculation by domestic buyers as well. As a result the prices of wheat and flour were sent to abnormally high levels.[3]

In April, 1917, the United States entered the War. Prices, already high, soared still higher. In May, wheat was $3.25 a bushel in New York City and flour $14 a barrel. The 1916 wheat crop was short of the high levels of previous years; the crop of 1917 was only slightly larger. The German submarine warfare had so reduced world tonnage that distant wheat supplies were unavailable.[4] It became clear that every bushel of our crop, and more, would be needed to meet the needs of normal home consumption and to supply our allies. In addition, the President was determined that the prices of food supplies should be kept within reach of

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[1] Average price per barrel of patent flour in Minneapolis:

1914......	$5.10	1916.....	$ 7.09	1918.....	$11.11
1915......	6.66	1917.....	11.34	1919.....	12.00

(Minneapolis Chamber of Commerce, *Annual Reports.*)

[2] Edgar, *The Medal of Gold*, 284–86.

[3] Litman, *Prices and Price Control*, 221.

[4] *Ibid.*, 219.

the people. 'The experience of Europe already on its third year, in dealing with the food situation, showed plainly that the occasion for concern in the matter of both the supply and the cost of food was very real.'[1]

In May, 1917, the President asked for legislation giving him extraordinary powers over the food supplies of the country, which powers were granted in the Food Control Act approved August 10, 1917.[2] Even before the passage of the act[3] a committee of the Millers' National Federation had been invited to come to Washington to confer with Herbert Hoover, already designated (unofficially) as Food Administrator.[4] The millers voluntarily agreed to subject themselves to the regulations of the Food Administrator, since he had, as yet, no legal authority. The tentative system worked out by the committee was confirmed by the Food Administration as soon as the Food Control Law went into effect. Essentially, the millers were to become a part of the Food Administration, coöperating with it rather than being regulated by it. Thus the industry was to be largely self-controlled, yet the wastes of competition were to be avoided, prices stabilized, profits limited. The mills of the country were to be divided into nine milling divisions, each in charge of a member of the central committee with a subcommittee to assist him. The central committee, with James Ford Bell, of the Washburn-Crosby Company at its head, was to exercise general supervision from its headquarters at New York. The United States Millers' Committee thus became the Milling Division of the United States Food Administration.[5] The agreement between the millers' representatives and the Food Administration may be summarized as follows: (1) The millers were not to purchase wheat at a higher price than the fair price fixed by the

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[1] Hibbard, *Effects of the Great War upon Agriculture*, 100.

[2] *Official Bulletin*, May 21, 1917, p. 4. Food Control Act, Public Document no. 41, H.R. 4961, 65th Congress.

[3] In June, 1917. [4] *Northwestern Miller*, July 3, 1918, p. 35.

[5] *Ibid.*, July 3, 1918, p. 35.

Government. (2) The Government-owned Grain Corporation was to supply the mills with wheat on the basis of their average pre-war output. (3) The millers were to sell their output at a net profit not exceeding twenty-five cents a barrel on flour and fifty cents a ton on feed. (4) The millers were not to sell flour for more than thirty days in advance nor store more than thirty days' supply of wheat. (5) The export orders for flour were to be apportioned over the entire milling trade.[1] Since the Government controlled wheat prices through its Grain Corporation (which, through its enormous purchasing power, was able to make the legal minimum price the maximum as well), it was able, by means of these agreements, to stabilize flour prices as well. Hoarding and speculating were prevented and a reasonable spread between wheat and flour prices insured.

Since a minority of the milling trade refused to sign this agreement, it became necessary to adopt a licensing system for the entire trade, and this was done in October, 1917.[2] By this means the recalcitrants were compelled to observe the agreement, though they were not signatories of it. Following this, the Milling Division applied itself earnestly to the task of wheat conservation made necessary by the needs of the Allies. In December the millers were ordered to cease separating their flour into the various grades and to make instead a 'straight' flour, using not more than 264 pounds of wheat for a barrel, with a minimum extraction of 74.3 per cent. Only five per cent of the poorest flour might be separated from the rest and sold as 'low grade.' In March, 1918, even this was forbidden and a '100 per cent' straight flour became the standard.[3] Meanwhile, in January, the mills were required to turn over thirty per cent of their output to the Government for the use of the army and export to the Allies. All purchasers of wheat flour were required to buy proportionate quantities of substitutes (non-wheat flours). Millers were forbidden to sell to any customer more than seventy per cent of the amount sold him the previous year, and the soliciting of business was practically prohibited. In February, 1918, the Food Administration inaugurated a system of bread-rationing for hotels, restaurants, and dining-cars. In March, it announced that the home consumption must be cut in half for the remainder of the crop year. By these methods the situation was saved. When the new crop began to come on to the market, it was estimated that there was less than ten days' supply of the old wheat left in the country, so close had been the figuring.[1] Domestic consumption had been cut down, it is estimated, over twenty-five per cent, and the result was that we 'contributed 110,000,000 bushels of wheat toward the feeding of the European Allies out of a saving from our tables.'[2] In part this was the result of abstention ('Wheatless Mondays'), in part through the enforced use of substitutes, but probably the greater part of the saving was due to a higher percentage of extraction.

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[1] United States Food Administration, *Policies and Plan of Operation*, 39.

[2] *Official Bulletin*, October 30, 1917, p. 2.

[3] *Millers' Almanack* (1920–21), 58.

The 1918 crop was large enough to relieve the strain of the situation,[3] and the Milling Division, which was, as we have seen, a committee of the leading millers of the country, now resigned in a body. The regulation of milling and the flour trade was then transferred to the United States Grain Corporation, of which Mr. Julius Barnes was the head.[4] New regulations were drawn up for the trade, the most important change being that, instead of fixing the profit margin and then letting each miller fix his own price, the Food Administration now published weekly a schedule of 'fair prices' relying on public opinion to force each miller to stay within this limit as a maximum.[5]

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[1] *Millers' Almanack* (1919–20), 33–34.

[2] Hibbard, *Effects of the Great War upon Agriculture*, 127.

[3] See below, p. 270, n. 3.

[4] *Northwestern Miller*, July 3, 1918, p. 35.

[5] *Official Statement of the United States Food Administration*, September 12, 1918, pp. 10–11.

On the whole the millers supported the new régime with less unanimity than they had the old. They criticized the Grain Corporation for exporting wheat rather than flour, and their criticisms forced a change of policy, so that in November, 1918, the Corporation announced the purchase, in a single day, of 1,500,000 barrels of flour for export. The rule requiring the retailer and consumer to purchase proportionate amounts of non-wheat flours ('substitutes') with wheat flour worked so badly[1] that in August the Food Administration asked Congress to suspend the Mixed Flour Law for the duration of the War in order that it might require the millers to mix the substitutes into the wheat flour at the mill. Only the strongest opposition from the millers prevented the adoption of this proposal.[2] In November the signing of the Armistice caused a relaxation of the regulations. The substitute regulation was dropped and most of the others cancelled in the following months. This included the fair-price schedules and price and quantity restrictions on sales by millers. Competitive conditions were once more restored, 'patent' flours were again manufactured, and distinctive flour types reappeared. But the activities of the Grain Corporation as a buyer and seller of flour continued.

The winter-wheat crop of 1919 was enormous; the spring-wheat crop rather poor.[3] Consequently there was a large

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[1] The public did not take kindly to the substitutes and they were largely wasted. Moreover, they deteriorated rapidly, so that millers soon accumulated a vast quantity of unmarketable goods. (*Millers' Almanack* (1919–20), 35.)

[2] *Northwestern Miller*, September 18, 1918, p. 977.

[3] Winter-wheat and spring-wheat crops, 1914–19 (in thousand bushels):

	WINTER	SPRING	TOTAL
1914	685	206	891
1915	674	352	1026
1916	481	156	636
1917	413	224	637
1918	565	356	921
1919	760	208	968

(Department of Agriculture Estimates. *Statistical Abstract of the United States* (1926), 628, 671.)

difference in the price of the wheats and the corresponding flours. The Grain Corporation thought this difference unjustifiable and, having large stocks of winter-wheat flour on hand, began a campaign of advertising and special offers not only to sell these stocks, but, according to the spring-wheat millers, to depress the price of spring-wheat flour. The Grain Corporation denied any such intention, but a great deal of ill-feeling was aroused.[1]

The spring-wheat millers had been getting good prices for their 1919 output, but in the spring of 1920, due to these activities of the Grain Corporation, they claimed, prices dropped and many mills were forced to shut down. Undoubtedly there were other causes for the depression. The spring-wheat crop shortage forced them to bring in large quantities of hard-winter wheat to keep up the standard of their flour. The derangement of the transportation system made shipments difficult. By midsummer, general business depression had set in. But, admitting these things, the spring-wheat millers still felt that the Grain Corporation was discriminating unfairly against them and that this was a principal cause of their difficulties.

The problem of de-control now came to the fore. The general expectation was that market prices would drop greatly as soon as Government control was removed. This situation led to the passage of the Lever Act of March 4, 1919, which continued Government control to a date not later than June 1, 1920. On June 24, 1919, the millers' committee reached an agreement with the Grain Corporation by virtue of which they were guaranteed against any possible losses resulting from a lowering by the Government of wheat prices during the following year. Under these conditions the restrictions on the trade were gradually lifted, free competition was resumed, and Government control gradually faded out of the picture.[1]

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[1] *Minneapolis Journal*, March 9, 1920. Interview with Julius Barnes. The flour was offered directly to retailers under a 'United States Grain Corporation Standard Pure Wheat Flour' brand and the advertising appeal made directly to the Consumer. (*Millers' Almanack* (1920–21), 48.)

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[1] The text of the Lever Act and of the agreement between the Grain Corporation and the millers is given in the *Millers' Almanack* (1920–21), 63–69.

CHAPTER X

MARKETING THE PRODUCTS OF THE MILLS — DOMESTIC TRADE

I. The Development of Marketing Organization

In view of the importance of marketing methods and marketing organization in the development of any industry, it is remarkable that so little is said on this subject in the milling journals. Most of the material to be presented in this chapter has been obtained by personal interviews with members of the trade or from correspondence of milling companies.[1] Since the sources are almost exclusively Northwestern, the discussion must necessarily deal mainly with the marketing methods and problems of the Northwestern millers, with but slight discussion of developments in other regions. Nor will anything by said of conditions before the Civil War, since some attention was paid to marketing methods and organization in the colonial and early national period in the chapters dealing with those stages of milling development. We begin, therefore, with the situation about 1860, when the millers of the Mississippi River States began to assume leadership in Eastern markets.

At that time, as has been shown, St. Louis and New Orleans were the assembling points to which the mills along the river shipped their flour by boat and from which the flour was distributed to the chief consuming markets.[2] The Civil War, and especially the opening of railroad connections with the East, caused a shift in the trade so that from that time on the Eastern distributing centers were reached directly.[1] For a time almost all the flour intended for Eastern markets was sent to NewYork City and thence distributed to minor centers. After 1870, however, when Boston, Albany, Buffalo, and other cities began to develop an independent distributing business, New York City lost its overwhelming preëminence.

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[1] Much material of value in this connection was found in the *Hale Papers* in the Minnesota State Historical Society Library. Major W. D. Hale was the active head of the Washburn Mill Company, owners of the Palisade mill at Minneapolis and the Lincoln mill at Anoka, Minnesota, during the years 1879–89. The *Hale Papers* contain a considerable correspondence between Mr. Hale and the Eastern representatives of the company and also a number of letter-books of the company.

[2] *St. Anthony Express*, November 29, 1852.

For the Northwestern mills, New York, Pennsylvania, and New England constituted almost the whole domestic market for some years. As late as 1885 they had but a slight hold on the Chicago territory [2] and had made little or no effort to reach the Southern States, where the flour from the St. Louis area was, it was thought, better suited to the climate and the tastes of the people.[3]

In shipping to these distant markets the millers at first relied wholly on commission men. The commission houses might specialize in flour or they might sell other products as well. Usually they were given exclusive rights in marketing the flour of the mill in their territory. The miller shipped on consignment, which meant that the commission house sold the flour at the best price it could get, deducted a percentage charge for selling, warehousing, collecting the proceeds, etc., and remitted the remainder to the miller.

Thus, while the commission houses did not buy the flour outright, the miller lost control of it as soon as it was shipped. Very often the commission houses came to exercise considerable control over the manufacture of the product as well. They could suggest what types of flour were most likely to sell in their market. Often they lent financial assistance by advancing money on the flour previous to its sale. Sometimes members of the commission houses became silent or active partners in Western mills. Usually the flour was sold under a brand owned by the commission houses. Honest and conscientious commission men were a great help to millers selling in distant markets where they were unknown and had few connections. In the decade of the eighties, it is claimed, too many irresponsible men got into the field. To these the temptation to deal unfairly with the millers proved too strong to resist. It was easy for them to deceive the millers as to the price at which the flour was actually sold and to make extra and unfair charges. As a result this type of business has declined greatly in the last three decades.[1]

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[1] *Commercial and Financial Chronicle*, August 21, 1878.

[2] *American Miller*, XIII (1885), 235.

[3] The *Northwestern Miller*, February 27, 1880, p. 130, notes, however, that some Minneapolis flour is being sold in southern territory through Chicago commission men. A representative of the *Louisville Courier-Journal* had been calling on the Minneapolis millers urging them to advertise their flour in his territory.

The abuses of the commission business caused, at least in part, the rise of the flour broker. In dealing with the former, the miller had to select a particular market, hand over the goods to the commission house, and take whatever price they secured for him. In dealing with brokers he could wire several in different markets, select the best offer they secured for him, and control his flour until it was sold. The commission house sold over a wide territory — all New England, for example, while the broker might sell only in a single city. The commission house represented a particular miller; the broker did not. He made it his business to know the sources of supply and to cultivate the flour-buyers of his territory. Finding that the buyer was in the market for a particular type of flour in certain quantities and at a given price, the broker proceeded to find a miller who could satisfy the demand. Or, having secured an offer from a miller, he made it his business to find a flour-buyer to whom it would appeal. Having brought buyer and seller together, he collected his fee and dropped out of the transaction. He did not assemble or store, incurred no financial responsibility, and made no collections as did the commission houses.

The products of the small mills and the unadvertised products of the large mills are usually sold through flour-brokers to-day. The small mill's product varies greatly in quality and quantity from year to year because of its dependence on fluctuating local wheat supplies. One year it may manufacture only enough to supply a local market; the next it may have a surplus which it must ship to the great consuming centers. Even where it has a regular surplus the small mill cannot supply the same customers year after year, since these demand, above all, a stable quality. In any case, small output makes it impossible to send out salesmen to hunt up customers. The broker, however, saves selling expense by handling the product of many different mills scattered over a wide territory. Since he is usually an expert judge of flour, the bakers and grocers, whom he cultivates, rely greatly on his judgment and knowledge.

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[1] *Northwestern Miller*, January 21, 1898, p. 101. See also *ibid.*, April 16, 1880, p. 243.

There is, of course, no hard-and-fast line between the different types of middlemen. Sometimes brokers buy flour outright as a speculation; occasionally they help out a small mill financially, by advancing money on flour which they sell on deferred payments. Some brokers even keep small quantities of flour on hand to fill rush orders. Occasionally the broker is the exclusive representative of a mill. In all these matters he is acting as a commission man or jobber rather than as a broker.

In recent years there has been developed a third type of mill-representative, namely, the miller's agent. He usually has a more restricted territory than the commission house, does no financing, does not hold title to the goods, and has less control over prices. But he differs from the broker in that he usually has an exclusive territory, and sometimes warehouses the flour and distributes it in smaller lots than the original shipment. His mode of compensation varies greatly. Sometimes he receives a percentage on sales, sometimes a flat carload rate, sometimes a regular salary. In the last case he is practically an employee of the companies for which he sells. However, he may sell for a number of companies and may hire salesmen to sell for him.

The latest development has been the policy, inaugurated by the larger mills, of selling flour direct to dealers. Whenever they have advertised their brands so that they are widely and favorably known, and produce a stable product which the same buyers will purchase year after year, they find it possible to eliminate commission house, broker, and miller's agent for a large part of their sales. They will still accept orders from brokers. They will still sell unbranded, unadvertised products through commission houses and use millers' agents in particular markets. But by various methods — correspondence from the mill, branch offices in the chief distributing centers, and traveling salesmen — they will sell their flour directly to the retail grocer and the baker, thus eliminating one middleman if not two or three.

As late as 1903 *The Northwestern Miller* was arguing the question as to whether it was better to send out salesmen or to rely on middlemen to sell one's flour. The millers of St. Louis were said to prefer the brokers.[1] *The Northwestern Miller* argued, however, for salesmen. The latter were apt to try to get the highest possible price for their mill, whereas the broker would sell at the lowest price the mill was willing to allow. Because he handled the products of a number of mills, his allegiance was divided; the miller could never be certain that the broker was not pushing the flour of a rival rather than his own. In disputes between mill and customer he was apt to take the side of the latter.[2]

The miller, then, may sell *through* a commission house, a miller's agent, or a broker. He sells *to* jobbers, bakers, and retailers. The jobber is a man (or firm) with considerable capital. Jobbers buy outright from the mill in car lots selling again to smaller jobbers, retailers, and bakers. Some deal in flour exclusively, others are wholesale grocers. The jobber assembles flour from different mills, stores supplies so that the baker and the grocer may have quick delivery, and often finances sales by granting credit to them. Sometimes, though not often, he operates a blending plant in which he may mix the products of different mills in order to secure a uniform quality. Often he owns valuable brands under which the flour is sold.[1] 'The tendency among many mills has been to sell to the jobber direct, so far as possible, and particularly where the use of family flour predominates, and to depend upon the broker, where direct sales representatives are not employed, in the bakery trade.'[2]

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[1] *Northwestern Miller*, April 22, 1903, p. 826.

[2] *Ibid.*, April 22, 1903, p. 826.

The branch office with traveling salesmen tends to eliminate not only commission house, broker, and sales agent, but the jobber as well. In some cases old established flour houses have been bought out by the mills.[3] In others, the millers have simply set up their branch houses and assumed the jobbing function. In 1920 the Pillsbury Flour Mills Company had some twenty-four such branches scattered over the United States from Boston to Los Angeles and from Jacksonville to Portland, Oregon. For a time the larger mills were selling from thirty to sixty per cent of their output in this way directly to bakers and retailers.[4] The small mills could not establish such branches because of their smaller volume of business, and therefore they continued to sell by the old method. Nor did the larger mills eliminate the jobber completely. In many territories an old established firm was too strongly entrenched; in others the volume of business was too small to justify the heavy expense.

The development of the public warehouse system in recent years, making it possible for the miller to store and deliver flour in distributing centers at very low cost, has also encouraged the elimination of the jobber, as has the increasing tendency of the larger bakers and retailers to go direct to the mill to purchase their flour. The most important driving force has been the severe competition which has forced the miller to seek every opportunity to lower costs and selling price. The jobber's profit seemed particularly easy to eliminate.[1]

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[1] A writer in *The Miller's Journal* (XIII, 615) in 1885 claimed that three fourths of the flour being sold in the United States at that time was going out under commission house or jobber brands. A writer in *The American Miller* at about the same time (X, 266) debated the question whether the commission house had the right to remove the miller's brand and substitute its own.

[2] *Northwestern Miller*, February 9, 1927, p. 543.

[3] The Pillsbury Company, for example, bought out, in 1924, the New York flour house which had been handling their business for a generation. (*Northwestern Miller*, April 16, 1924, p. 256.)

[4] *Ibid.*, April 24, 1918, p. 267.

Selling direct, however, has not always brought lower costs. The miller has found it necessary largely to increase his sales force to handle the same volume of business. The work of the credit and the accounting department has also greatly increased. Shipments must often be made in smaller quantities so that the expense of handling is greater also. The prevalent custom of hand-to-mouth buying has increased the miller's difficulties.[2] For these reasons there has been a recession of the movement toward selling direct. The larger companies have found that they have too many branch houses. The Washburn-Crosby Company, for example, increased the number of its branch houses from twenty-three in 1905 to eighty-eight in 1912, but since then has reduced the number to thirty-two.[3]

The chief markets for flour are, of course, our largest cities. The miller who wishes to keep his mill operating at full capacity, in order to secure a low per-barrel cost, often dumps his surplus product here. Consequently prices are usually low in these 'outlet' markets and competition severe. Both because of its large consuming population and its importance as a distributing and export center, New York is the most important single market. Seven million barrels of flour are annually consumed in New York City and its suburbs. Of this, *The Northwestern Miller* estimates, about forty per cent is spring-wheat flour, thirty-five per cent Kansas, and the rest soft-wheat flour. In 1923 there were said to be some two hundred and fifty wholesale flour dealers in the city, of whom one hundred and seven were specialized flour jobbers, forty-three were brokers, twenty-three wholesale grocers, and the rest flour and feed dealers. Then there were a number of large blending plants which catered both to the domestic and foreign trade, and also some 'flour-doctors' who took flour that had been rejected by the inspectors and reconditioned it.[1]

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[1] *Northwestern Miller*, May 17, 1927, p. 628. 'The Evils of Selling Direct.'

[2] *Ibid.*

[3] Edgar, *The Medal of Gold*, 249. They established their first branch office in Boston in 1882, and opened their Chicago office in 1890. In 1893 an office was opened at Buffalo, in 1900 at New York and in 1901 at Providence. (*Ibid.*, 164 ff.) Edgar suggests that the chief reason for the decrease was the inability to secure sufficient men of the requisite ability, training and experience to manage all the offices.

In former years it was customary to do most of the buying in the fall of the year when the new wheat came in, but in recent years the tendency has been to carry smaller stocks and order oftener and in smaller quantities. The larger bakeries, the jobbers, and the wholesale grocers buy in large lots — sometimes in thousands of barrels, while distribution to smaller jobbers, bakers, and retail grocers is made in smaller lots and on longer credit. In many cases their accounts are never fully paid and the middlemen are forced to take over their properties.[2]

Up to 1890 none of the mills attempted anything like a nation-wide distribution. They all had their local home market, of course, and their surplus was shipped to the Eastern and the export market. This was true even of the larger Minneapolis companies. After 1890 these suffered a decline of their export business, and, whether this was cause or effect, they began a systematic attempt to expand their domestic markets. This was consonant with the economic development of the period. With large-scale production, the millers found it more and more dangerous to depend on single, or narrowly restricted, markets, since these were often in a state of depression. A wide distribution is bound to find some market in good shape. Further, a wide distribution is necessary in order to secure a large volume

[1] *Millers' Almanack* (1923), 93.

[2] *Ibid.*

of business, and lastly it is, itself, an advertisement for a product, though the wide distribution may result from advertising of a more formal nature.

For these reasons, then, the larger milling companies have been anxious to extend their markets to all quarters of the country. In doing so they have depended to a large extent on advertising publicity, of which there has been a notable extension since 1900. There was, of course, advertising by millers before that date, newspaper advertising being fairly common almost as far back as colonial times.[1] The art of advertising did not make a great deal of progress in the period up to the Civil War if one may judge by the samples which we have.[2] In this and the following decade, the miller advertised in his home newspaper, more, perhaps, as a matter of civic pride than from any expectation of returns.[3] He also spent quite a lot of money on lithographs of his mill, calendars, show cards, etc., which were sent out to the retailers through the jobbers. In the eighties he began to advertise in the newspapers of the chief distributing centers, appealing to the retailer and the baker, however, rather than the consumer. Somewhat later there were many novel experiments in publicity along the line of sample distribution and demonstrations of the product.[4]

About 1885 the Northwestern millers began to advertise extensively in the trade-journals, which up to that time had depended mainly on advertisements of milling-machinery firms for their revenue.[1] Their example was not followed until about 1900[2] by the millers of other sections; for they were dubious of the value of advertising. 'The amount of money thrown away in foolish advertising, dodgers, posters, pictures and other clap trap by the northwestern millers in the big cities from Buffalo to the seaboard, is something enormous,' said *The United States Miller* in 1893. 'One good live agent will do more in a day toward selling flour than $100 worth of that sort of nonsense.'[3] *The Modern Miller*, on the other hand, was convinced that the millers of its area (the Southwest) were not doing as much advertising as they should. 'While the flour manufacturers of the northwest have advertised to the world, through every possible means, their wonderful claims for the spring wheat product, not a word in behalf of their splendid foodstuff has been uttered by the men who grind the winter grain. Like some coy, bashful maiden they have shunned publicity and notoriety; and through sheer force of claiming everything, the millers of the Northwest have pushed their goods into almost every market where American flour is handled.'[4]

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[1] For example, an advertisement in the *Goshen (New York) Repository*, February 4, 1794, announces that William Deming, Robert Browne, and Samuel McCoun, 'having entered into a joint concern for the purpose of manufacturing wheat . . . and also for the carrying on of the tannery in that vicinity and supplying the country with every necessary article of merchandize' give notice that they are now ready to buy wheat 'for which a generous price will at all times be given in cash, leather and merchandize. . . .'

[2] The Brooklyn City Mills advertise in Bradstreet's *Gazetteer of the Manufactures of the United States* (1866), p. 98, as follows: 'Superior fresh-ground flour of all grades, constantly on hand, put up in round-hoop barrels and half-barrels, suitable for the West India and South American markets, delivered on board free of charge. Also choice Family and Bakers' Flours.'

[3] *Northwestern Miller*, March 13, 1903, p. 979.

[4] *Ibid.*, November 18, 1898, p. 868.

Up to this decade (1890–1900) the millers' advertising was still intended to reach the middlemen and the retailers rather than the consumers. During this period, however, they were forced to spend a good deal of money in combating the attacks of the breakfast-food makers and the advocates of whole-wheat breads. To do this they had to appeal directly to the consumers, and this led some of the leaders of the industry to consider the desirability of advertising their flour directly to the consumer. The Washburn-Crosby Company began in 1893 a campaign of bill-board advertising,[1] and about ten years later was the first of the milling companies to advertise its flour in such magazines as *The Ladies' Home Journal*. The Pillsbury Company soon followed their example. In recent years the Quaker Oats Company has advertised its flour in the same way and there may have been a few others.[2] But only a few of the largest companies have the volume of output to justify the use of such an expensive medium or are in a position to handle the nation-wide distribution which it makes possible. Moreover, the trend away from home-baking, which recent years have witnessed, makes the value of consumer advertising dubious, since if the housewife does no baking there can be little advantage in extolling to her the merits of Gold Medal or Pillsbury's Best. The baker can be reached most effectively through trade-journals, and it is noteworthy that milling journals tend to appeal more and more to the bakery trade.[3] The Pillsbury Company has attempted to capitalize on the good-will created by these past expenditures by showing the baker that he can appeal to the public to buy his bread on the ground that it is composed only of materials publicly recognized as the best, in the same way that the automobile producer argues for his car by pointing out that it has standardized parts of well-known manufacture. While there can be no question that home-baking has decreased in relative importance, it is probable that nearly two thirds of the flour is still baked in the home. Accordingly, direct consumer-advertising still has its place.[4]

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[1] The Washburn-Crosby Company began advertising in *The Northwestern Miller* about 1884.

[2] *The Modern Miller*, June 1, 1901, p. 11.

[3] *United States Miller*, October, 1893, p. 219.

[4] *Modern Miller*, June 1, 1901, p. 11.

At any rate, there can be no question about the immense success of this nation-wide appeal to the consumer in the first decade after 1903. The Minneapolis millers were again the first to take advantage of the new method and they reaped the benefit. In that period they extended their sales to every part of the country. To-day there is not a single area in which the local miller does not have to face their competition.[1] Whether, with a continuation and acceleration in the decline of home-baking, this national advertising campaign will be continued, and will still hold distant markets, no one can now tell.

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[1] Edgar, *The Medal of Gold*, 261.

[2] Especially those having special preparations to sell as, for example, the Aunt Jemima Mills of St. Joseph and the manufacturers of Swans-down cake flour.

[3] As, for example, *The Northwestern Miller*, which has recently revived a sub-title, *The American Baker*.

[4] *Northwestern Miller*, April 28, 1926, p. 333.

II. The Millers and the Baking Industry

It has recently been pointed out that there are really two distinct divisions to the baking industry. There is the biscuit and cracker section which is concentrated, large-scale, and machinized to a great degree, and there is the bread and pastry section which until recent years was just the opposite.[2] The last few years has brought a change in the bread-baking division, however. The growing industrialization and urbanization of the country and the improvements in road-building and transportation equipment have created dense areas of large population which provide a market for large-scale production. Improved baking machinery (especially high-speed mechanical mixers) and the change of baking from an art to a science which is laboratory controlled by rigid formulas have made possible mass production. The result is the growth of large-scale commercial baking as distinguished from the small-scale neighborhood bakeries and with it a trend away from home-baking. In the rural sections a majority of the population still bakes its own bread, but in our cities two thirds of bread consumed is baker's bread. For the country as a whole the bakers do not use more than a third of the total flour supply.[1] Nevertheless, the proportion of baker's bread to the total is increasing. Hence the importance of the movement in recent years, not only toward large-scale production but combination as well. Only a few of these combinations will be listed: (1) The General Baking Company formed in 1911 to acquire the properties of twenty-six companies in fifteen of our largest cities. On this was superimposed, in 1925, the General Baking Corporation, which absorbed the former company and also the Smith Great Western Baking Corporation, a combination of six Western baking companies. (2) The Continental Baking Corporation, a combination of one hundred and three bakeries in eighty-one cities stretching from Massachusetts to California. (3) The United Bakeries Company formed in 1922 by an amalgamation of the Campbell Baking Company of Kansas City and Ward and Ward, Inc., of Buffalo. The Campbell Company was itself a combination of eight smaller Western companies, while Ward and Ward, Inc., was a consolidation of a number of companies operating seven large Eastern plants. Later the combination absorbed ten other companies each operating a number of large plants. (4) The Ward Baking Corporation, formed in 1924, operated sixteen plants in twelve different cities. (5) The Purity Bakeries Corporation in 1924 absorbed six large companies and now operates thirty-five plants in twenty-three cities.[2]

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[1] This, with the high freight rates that prevailed after the Great War, and the possibility of using local wheat supplies, led them to expand their milling activities to other areas. The Washburn-Crosby Company, for example, now operates, directly or through subsidiaries, mills at Minneapolis, Buffalo, Kansas City, Louisville, Kalispell, Great Falls, and Ogden.

[2] Alsberg, *Combinations in the American Bread-Baking Industry*, 1.

The year 1925 was 'the year of mergers' for the baking industry, culminating in January, 1926, with the formation of the Ward Food Products Company capitalized at $2,000,000,000 and having as its object the absorption of a number of the larger companies. The General, the Continental, and Ward Baking Corporation were generally mentioned as likely to be absorbed. Threatened action by the National Government under the Anti-Trust Law, however, caused the plan to be given up.

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[1] *Northwestern Miller*, August 27, 1924, pp. 818–19; May 26, 1926, p. 796.

[2] *Millers' Almanack* (1926), 322–24.

The suddenness and rapidity with which these mergers were developed caused a good deal of alarm among the millers.[1] There was, first of all, the fact that the concentrated buying of the bakers gave them an advantage in the face of the competitive selling of the millers. Said *The Northwestern Miller*, 'It is probable that, in spite of resolutions of condemnation — the concentrated buying power of the bakery mergers will continue to assure them possession of their flour at milling cost or less.'[2] The smaller bakeries, fearing that this situation would make them pay the flour bills of the merger, combined in self-defense into coöperative buying groups.[3] The growth of chain-store groceries, with their concentrated buying power, increased the danger to the mills. There were isolated cases of bakery combinations purchasing mills so as to be independent (in part at least) in their flour supplies.[4]

The alarm of the millers was increased by their growing feeling that they were losing touch with the ultimate consumers of their product with the decline of home-baking and hence were becoming more and more dependent on the bakers. The millers are not sure how far they can trust themselves to the mercies of the bakers. Yet the more far-seeing men of both groups feel that they are in the same boat. It is just as much to the baker's interest to encourage the farmer to grow better wheat as it is to the miller's interest to persuade the consumer to eat more bread. The bakers contend that the millers have small hopes of increasing the volume of their domestic business otherwise than through the commercial baker. Hence their conclusion is that 'the success and growth of the commercial baker should be the chief concern of the miller to-day.'[1] The danger of this is that it may involve the millers in a campaign to increase the bakeries' market at the expense of the household buying.

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[1] *Northwestern Miller*, December 10, 1924, p. 1039, 'The Danger of a Bread Trust.'

[2] *Ibid.*, June 2, 1926, p. 875.

[3] *Ibid.*, October 1, 1924, p. 37; April 21, 1926, p. 225.

[4] *Ibid.*, December 9, 1925, National Baking Company mill at Omaha, bakeries at Indianapolis, Columbus, Cincinnati, Dayton; *ibid.*, March 24, 1926, National Biscuit Company purchases 4000-barrel mill at Toledo.

There remains to be considered the possibility that concentrated bakery buying may force combinations in self-defense in milling.[2] These might be in the nature of agreements or associations directly or indirectly supervised by the Millers' National Federation. A proposal of this type was presented to the Federation in 1925.[3] It involved three ideas: (1) the making of sales to specified groups of buyers through a single and exclusive brokerage agency; (2) pooling of production and selling to these customers under pool brands; (3) consolidation of plants and companies. The Federation Committee to whom the matter was referred reported unfavorably. They considered it out of the province of the organization to promote such ends. But further developments are likely both along the lines of selling pools and of mergers and consolidations. The increasing strength of the bakery mergers will make still harder the lot of the small independent mill, so that ultimately the great baking corporations will have to purchase their flour from great milling corporations which will be as strong financially and at least as well managed as themselves — or else mill their own flour. This latter development is not likely to come very fast. Presumably by producing in large units, with one hundred per cent operation, minimum overhead, and no sales cost, the big bakeries could produce the flour at lower costs than the best of the milling companies.[4] The experiments so far made, however, have not been conspicuously successful.

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[1] *Northwestern Miller*, April 28, 1926, p. 367. Letter from L. J. Schumaker, President of the American Bakers' Association, to the Editor.

[2] *Ibid.*, April 28, 1926, p. 369; November 25, 1925, p. 784.

[3] *Ibid.*, November 25, 1925, p. 752.

[4] *Ibid.*, March 24, 1926, p. 1169.

CHAPTER XI

MARKETING THE PRODUCTS OF THE MILLS — FOREIGN TRADE

I. General Development of the Trade since 1860

Up to about 1830 almost all the wheat exported from the United States was milled before being shipped.[1] In the next fifty years the flour exports, while increasing greatly in volume, did not keep pace with the expansion of wheat exports, and the percentage of wheat exported in the form of flour declined from 99.6 per cent to 18.8. The factors causing this situation were many and complicated. European milling technique was making great improvements in this period, tariff changes were on the whole unfavorable to the American flour, and the American railroads favored wheat as against flour by lower export rates. It may be doubted if

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[1] Relative exports of wheat and flour from the United States (reducing the flour to wheat on the basis of four and a half bushels of wheat to one barrel of flour):

Five Years Ending	Bbls. Flour	Per Cent of Wheat Exported in Form of Flour
1795...	4,052,163	81.4
1800...	2,980,702	99.2
1805...	5,158,066	94.4
1810...	3,941,034	89.5
1815...	4,905,460	97.4
1820...	5,293,644	98.1
1825...	4,451,384	99.6
1830...	4,651,940	99.5
1835...	5,241,964	97.2
1840...	4,092,932	91.7
1845...	6,274,697	91.1
1850...	12,284,828	85.8
1855...	13,149,518	79.9
1860...	15,778,268	67.0
1865...	19,757,733	42.1
1870...	11,454,785	41.2
1875...	16,797,684	27.2
1880...	22,867,643	18.8
1885...	42,867,541	27.5
1890...	53,267,778	42.3
1895...	75,289,837	40.6
1900...	81,741,862	40.9
1905...	81,952,251	45.0
1910...	62,993,110	46.5
1915...	60,534,953	35.3
1920...	96,176,638	39.6
1925...	75,245,000	29.8

(*Hunt's Merchants' Magazine*, IV, 573; *Monthly Summary of Commerce and Finance*, January, 1900, pp. 2001, 2022; *Millers' Almanack* (1927), 206.)

American milling could have expanded rapidly enough to take care of this flood of wheat in any case. After the revolution in milling methods heralded by the introduction of the purifier, there was a revival of our export trade which continued through the period of the Great War. The story of that period of prosperity can best be told from the point of view of the Minneapolis mills, although it must be understood that the larger mills of other regions, particularly those of New York City and Buffalo, St. Louis, and the Kansas area, all shared in it to a greater or less degree.

II. The Export Trade of the Minneapolis Mills

Up to 1877 the Minneapolis millers depended almost entirely on the domestic market. Doubtless there had been some export shipments for there were occasional purchases by New York export houses in the previous decade.[1] There was no direct contact with foreign buyers, however, nor any effort to make the trade continuous and regular. Even after that date there were those among the smaller mill-owners who regarded the foreign market merely as an outlet for a surplus which could not be profitably sold at home. 'When stocks on millers' hands were too large, and exercised a depressing influence on local trade, consignments were made to the United Kingdom, or to the Continent, and a considerable proportion of our flour exports was made under those conditions.'[2]

The export trade built up by the Minneapolis mills after 1877, however, was of a different character. What they wanted was to build up a direct trade with European flour dealers, sell the flour under their own name and brands, and build up a permanent and stable trade — not merely a temporary relief from the pressure of overproduction. Governor Washburn seems to have taken the lead in the matter.[3] After vainly seeking to secure the coöperation of the other millers of the city, he arranged to send a representative to develop the trade. Accordingly, in 1877, W. H. Dunwoody was sent to England. It is said that, though he visited all the flour houses and large bakers in Liverpool, London, and Glasgow, it was months before he secured a single order.[1] The market was controlled by a combination of millers and flour and grain dealers, the *Minneapolis Board of Trade Report* claimed.[2] This is improbable because the British millers were at this time buying American flour to mix with their own.[3] More probably it was an objection to doing business through new channels and by new methods. There were a good many obstacles to overcome. The Americans shipped in barrels when sacks were wanted;[4] the English were accustomed to flour and bread containing more moisture than ours.[5] Doubtless, too, there had been just complaints against previous American shipments. These had been job-lots gathered by export houses from many different mills. Naturally there was no uniformity in quality, and some of it, it was claimed, was adulterated and misbranded.[6]

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[1] Minneapolis Board of Trade, *Annual Report* (1880), 56.

[2] Chicago Board of Trade, *Annual Report* (1901), lvii.

[3] *Northwestern Miller*, February 11, 1881, p. 84.

Under the circumstances, the trade was built up very slowly. Dunwoody found it necessary to go directly to the bakers, give them samples of his flour, and have them test it out.[7] The English bakers found the American flour was stronger than the British and would make more loaves per barrel. Their prejudices were gradually overcome. British bakers themselves forced British middlemen to buy of the American manufacturers.[8] From the principal markets the trade spread to all parts of the United Kingdom. At first

[1] Edgar, *The Medal of Gold*, 68–70.

[2] Minneapolis Board of Trade, *Annual Report* (1880), 56.

[3] *Ibid.* (1878), 53.

[4] *Commercial and Financial Chronicle*, December 30, 1882, p. 751.

[5] Pillsbury, *American Flour*; Depew, *One Hundred Years of American Commerce*, 270–71.

[6] Minneapolis Board of Trade, *Annual Report* (1880), 56.

[7] *Ibid.* (1878), 53.

[8] *Ibid.* (1880), 56.

only 'bakers' flour was sold, but later the British householder began to purchase the family 'patents' as well.[1]

The British millers, however, kept up the fight against American flours. As late as 1900 there were accusations that the American flour was often adulterated and that even the best-known brands were uneven in quality and unstable in character. As to the first point, we know that flour was being sold in the United States that was adulterated with cornflour and glucose.[2] It is not improbable that commission men who exported mixed lots of unbranded flour may have sent some of this to England. It is inconceivable, however, that the larger mills selling direct and shipping under their own brands should have done so.

The other charge was less serious, but probably contained more truth. In 1879 *The London Miller* said: 'There can be no doubt that English millers are in some degree affected by the large arrivals of American flour, especially since the introduction of bags as a substitute for barrels which for storage are more convenient, and which, when empty, do not occupy valuable space. The qualities of the flour are very various and the brands legion, it being a well-known fact that the same article is shipped in different names. One important fact in favor of the English miller is that the American maker has yet to learn that the bakers here expect, above all things, uniformity.'[3] So, too, *The British and Foreign Confectioner* said that the American millers used too many brands and did not secure a uniform quality in their flour. Also there was too much mixing of good American flour with inferior English, and of putting English flour into

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[1] *Ibid.* 'Patents' were the highest grades, 'bakers' the second. After 1900 the bakery trade began to object to the name claiming that they no longer used any but the highest grade flour. The name was then changed to 'Clears.' It was good flour but not so white as patent. (*Northwestern Miller*, February 21, 1900, p. 366.)

[2] United States Industrial Commission, *Report on Transportation*, IV, 240. Testimony of Frank Barry, Secretary, Millers' National Association. See also *Consular Reports*, 53: 515–16 (April, 1897).

[3] Quoted in *Northwestern Miller*, June 20, 1879, p. 383.

American sacks and selling it as American flour. The American miller should have his trade-mark registered in England so as to prevent this.[1]

Lastly there were difficulties connected with the financing of the shipments and the transportation of the products. The flour had to be sold on long credits, the sale of the bills of exchange had to be arranged for, and prices had to be figured to include commissions, insurance, and freight to European ports. Fluctuations in exchange had to be allowed for, there were delays in transit, and much flour was damaged because of improper storage and poor shipping facilities.[2]

Gradually, however, all these difficulties were overcome. The millers built up permanent connections with British importers, created a demand for their individual brands, and made contracts for shipments in stated quantities. The larger bakeries began to look to American mills for the greater portion of their flour supplies. The American millers could outsell their English rivals because of the excellence and cheapness of their wheat supplies and because the 'New Process' gave them a superiority in manufacturing methods. The direct shipments from Minneapolis amounted to but a few hundred barrels in 1877, but in the following year two other mills sent their agents to England and soon all of them were actively engaged in the export trade.[3] As it developed, the railroads were induced to coöperate with low export rates and through bills of lading and secured direct steamship connections allowing quick shipments.[4] In consequence, the Minneapolis direct exports rose to over one hundred thousand barrels in 1878 and to over a million in 1881. Then they mounted rapidly to two million in 1885, three million in 1891, and four million barrels in 1895.[5] From the British

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[1] Quoted in *The American Miller*, XIII (1885), p. 458.

[2] Barnes, 'Milling History of Minneapolis,' *Northwestern Miller*, Holiday Number, 1890, p. 34.

[3] *Ibid.*, March 22, 1878.

[4] *Ibid.*, February 11, 1881, p. 84; *Commercial and Financial Chronicle*, July 30, 1881, p. 113.

[5] Minneapolis Chamber of Commerce, *Annual Report* (1896), 115.

Isles the millers pushed their sales into other countries of Europe.[1] For a time it looked as if many of the mills would become entirely independent of the home market, disposing of their whole output in Europe.[2]

Having exploited the European markets, the Minneapolis millers then turned their attention to the other continents. As early as 1883 W. D. Washburn wrote from Washington: 'I hear nothing from you with reference to a South American trade for our flour. I do not believe either Crosby or yourself appreciate the importance of an early move in this direction.'[3] And again, a few days later he wrote: 'I think perhaps you had better correspond with parties in New York . . . and arrange to make a small shipment perhaps through them. My own judgment is we ought to send a good man to Rio and study up and work up the business.'[4] Here they seem to have met with a temporary check. The soft-wheat mills of the East had possession of the field and there was some doubt as to whether spring-wheat flours would survive a passage through the tropics. So it was not until after 1900 that the Washburn-Crosby Company established a direct trade with the West Indies and, somewhat later, began to make shipments to South America as well.[5]

More and more in the two decades, 1880–1900, the Minneapolis mills concentrated on the export trade though they never reached the point where they were entirely independent of the home market. The highest mark they attained was in 1886–87, when about forty per cent of their output was exported. Nor did they ever in any one year ship more than thirty per cent of the total American exports. *The Commercial and Financial Chronicle* in 1881 attributed the growth of the trade to 'the success of New York and western millers in establishing the reputation of their special brands and making contracts for their shipment in stated quanti-

[1] Minneapolis Board of Trade, *Annual Report* (1880), 56.

[2] *Northwestern Miller*, March 22, 1878.

[3] W. D. Washburn to W. D. Hale, January 20, 1883, *Hale Papers*.

[4] *Ibid.*, January 23, 1883.

[5] Edgar, *The Medal of Gold*, 244.

ties.'[1] Another article in the same journal mentions the Minneapolis and St. Louis mills as sharing, with those of New York City, the leadership in English markets.[2]

The growth of American flour exports to England was in fact due only in part to the advantages above mentioned. In part it was due to a period of depression and bad crops in British agriculture. Moreover, the British millers had been slow in adapting their methods and machinery to new conditions.[3] Their position was made extraordinarily difficult by the great variety of wheats which came to them from many continents and which they had to learn to mill to advantage. In the end they adopted the 'New Process' and worked out successful methods of handling the various types of wheat.[4] Large new mills were built at the seaports. With increased capacity and an assurance of being able to handle the variety of wheats successfully, came a desire for larger business, and they began an active campaign to induce the British public to demand home-milled flour.[5] There was no longer any pretence, however, that this was to be made from home-grown wheat. By 1900 the science of milling had advanced to the point where, it was claimed, the best flours were made from a judicious mixing of various kinds of wheat. British millers are peculiarly well-situated, since wheat comes to them from all parts of the earth. To be sure, they do not always get the best grades of wheat grown in the exporting countries.[6] Moreover, the supplies are constantly changing so that they must study not only the physical but the chemical properties of the wheats. Nevertheless, since 1900 they have been able to make a decidedly better showing against their foreign competitors.

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[1] July 30, 1881, p. 113.

[2] *Commercial and Financial Chronicle*, July 30, 1881, p. 113.

[3] Minneapolis Chamber of Commerce, *Annual Report* (1888), 113–14, quoting *The (London) Miller*.

[4] Humphries, Modern Developments of Flour Milling, *Journal of the Society of Arts*, 55: 110–11.

[5] Davis, *Flour and Wheat Trade*, 12.

[6] *Northwestern Miller*, April 2, 1924, p. 54.

The recovery of the British mills coincided with a decline in American exports. The American millers claimed that the American railroads discriminated against flour and in favor of wheat export shipments.[1] The steamship lines were accused of careless handling of shipments, and complaints were made of the London dock charges, which were said to have been heavier against American shipments than those from the Continent of Europe or the British colonies.[2] Most of all, the millers objected to the bill-of-lading used by the steamship companies in which they contracted out of practically all liability for damage to the cargo while in their care.[3] At the same time the British importers complained, on their part, of needless delays and irregular arrivals of cargoes from America.[4] The British millers, too, made propaganda out of the spread of durum-growing in America, which, they claimed, indicated a decline in the quality of American spring-wheat flours.[5]

For these reasons there was a decline in American exports after 1900 which continued until the beginning of the Great War in 1914. The Minneapolis mills suffered a relatively greater decline than the rest of the country. They had reached their high-water mark in 1900 with shipments of 4,702,000 barrels to foreign countries, this being thirty-one per cent of their total output. From then on, their exports declined both absolutely and relatively, until in 1926 only 117,000 barrels — less than one per cent of their output — was exported.

The United States' export trade revived after 1914, though that of Minneapolis did not. In part the decline of Minneapolis' exports was due to a shift of export business by the Minneapolis companies to their Buffalo mills;[1] in part to an increasing development of their domestic trade. Possibly, if they had been forced to do so, they might have made headway against the forces that were cutting down their export trade. But more and more, as population grew after 1900, they found the domestic market their most profitable field of operation and so gave relatively less attention to foreign fields.

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[1] See below, p. 312.

[2] Davis, *Flour and Wheat Trade*, 15; *Consular Reports*, 68:215–26 (February, 1902).

[3] Edgar, *The Medal of Gold*, 177–78. The millers finally secured the passage of the Harter Act which prohibited such contracting out of liability. The law, passed in 1893, was adopted in principle in other countries and so a much-needed reform in shipping practice was brought about. See also *Consular Reports*, 36: 69–73 (May, 1891) and 35: 481–85 (April, 1891).

[4] Davis, *Flour and Wheat Trade*, 15–19.

[5] *Ibid.*, 20–21.

III. The Export Trade in Recent Years

A. The Principal Markets

Between the beginning of the twentieth century and the opening of the Great War American flour exports declined steadily from about eighteen million barrels a year to eleven million. During the War this figure was doubled, but after 1920 decline again set in so that the exports for 1926 were the lowest since 1910. The principal markets before, during, and since the War are indicated below.[2] In pre-war times, the United Kingdom was our best customer. Next to the

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[1] See above, pp. 176, 219 ff.

[2] United States wheat-flour exports (in barrels), year ending June 30:

To	1913	1918	1926
Belgium	20,850	524,017	41,661
Brazil	583,418	101,927	987,777
British Guiana	107,565	19,253	2,740
China	127,814	275	505,834
Cuba	907,786	679,689	1,146,058
Denmark	243,549	20,331	321,483
Egypt	59,800	20,791	359,081
Finland	405,832	.....	451,584
France	9,440	4,845,358	8,543
Germany	170,345	.....	657,398
Greece	2,418	47,937	347,814
Haiti	288,495	10,924	279,383
Hong Kong	1,301,306	1,250	436,273
Italy	11,418	3,385,771	15,314
Jamaica	250,660	91,332	117,111
Japan	878,623	69	18,515

English-speaking countries, the Netherlands was our most important European market. Finland, the Scandinavian countries and Germany completed the list, for exports to the rest of Europe were negligible. In the Orient, Hongkong was the most important market, acting as a distributing center for the Far East and, next to that city, Japan and the Philippines have been most important consumers of American flour. In the western hemisphere, Cuba, Brazil, Haiti, and Jamaica have been the principal foreign markets.

During the Great War there were some striking changes due mainly to shipping conditions. The Cuban trade was cut in half; the trade with Haiti and Brazil disappeared almost entirely; the same was true of the West Indies generally. In the Orient, also, our flour trade melted away. The West Indian trade has been recovered since 1918, but in the Orient we have not been so fortunate. Japanese mills have developed very rapidly in recent years, and it is probable that our exports to that country will continue to decline. Chinese imports, on the other hand, grew so rapidly that by 1923 that country was our best customer. In part this was due to abnormal conditions resulting from crop failures in certain sections of the country, but mainly the increase points to a far-reaching change in diet and living standards

To	1913	1918	1926
Kwangtung........	.....	.....	164,585
Latvia............	.....	.....	277
Mexico............	25,738	368,550	206,207
Netherlands.......	859,987	69,253	1,224,963
Norway...........	266,287	214,810	267,067
Philippine Islands..	370,939	549	609,520
Poland and Danzig.	.....	.....	3,796
Sweden............	50,586	40	52,423
Turkey in Europe...	3,390	.....	831
United Kingdom...	2,428,167	10,055,827	1,439,113
All Countries......	11,394,805	21,879,951	11,850,322

(United States Department of Commerce, *Commerce and Navigation of the United States* (1913), 370–71; (1918), 376; (1926), I, 35.)

of the Chinese people which make it probable that the trade may prove a lasting one.[1]

Greatest of all, however, were the changes in our European trade. During the Great War the British purchases increased enormously. Switzerland and Belgium became very large buyers, and France and Italy, which are normally self-sufficient, took five million and three million barrels respectively in 1918. With the coming of peace, exports once more changed direction. Shipments to the United Kingdom dropped back to pre-war levels, French and Italian buying ceased, and exports to the Low Countries and Scandinavia became normal once more. On the other hand, the interrupted trade with central and eastern Europe was resumed. Finland, Germany, Poland, Latvia, and Ukraine made large purchases, and the Levant countries, particularly Greece, Turkey, and Egypt, became important buyers.[2]

It has seemed desirable to consider briefly the American millers' present position and future prospects in each of the more important markets. We begin therefore with the English-speaking countries which for two generations have been our most important markets.

(1) *The United Kingdom.* In 1900, when the Minneapolis export trade was at its height, the United Kingdom was importing annually about twelve million barrels of flour, nearly three fourths of which came from the United States. In the following decade the British milling industry was transformed by the introduction of modern methods and machinery, the building of the large port mills, and the elimination of thousands of small and inefficient interior mills. As a result the imports were cut in half, and, in spite of the increase in population, probably half the flour consumed in the country is now produced by British mills.[3] The United States mills, as the principal exporters, were hit hardest by this de-

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[1] *Northwestern Miller*, February 22, 1922, p. 816; February 20, 1924.

[2] *Ibid.*, July 6, 1921, p. 43.

[3] Report of the Royal Commission on Food Prices, summarized in *Northwestern Miller*, June 24, 1925, p. 1287.

velopment. In recent years the English mills have been barely holding their own, but in the meantime the rapid growth of Canadian flour exports has begun to cut in on our trade. The division of the British trade between the exporting countries is indicated in the table below.[1] The United States and Canada still furnish three fourths of all the imported flour, but Canada now has the lion's share of the trade; and it is the Canadian invasion which the British millers now view with alarm.[2] Canadian flour, they claim, is being sold so cheaply in England as to force down prices below costs of production. Their home market is declining and they have no export trade. Some of the British millers are buying Canadian flour to mix with their own; others are making a brave stand for the 'all-English loaf.' Meanwhile the English farmers complain that ninety per cent of the flour manufactured in the country is made by the port mills, which use very little domestic wheat.[3] There are reports of combinations to keep down prices of wheat and to restrict output,[4] of price-cutting campaigns to drive out imported flour,[5] and efforts to secure a duty on imported flour, which Montreal millers view with alarm.[6] The Canadian mills have the advantage of better raw materials and lower fixed

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[1] Wheat flour imports of the United Kingdom in barrels by fiscal years ending August 31st:

YEARS	1925	1924	1923	1909–13 AVG.
Total............	6,019,000	5,734,000	5,779,000	5,966,000
Per cent from:				
United States....	30.3	32.8	32.8	45.3
Canada..........	46.3	47.7	47.7	37.0
Australia........	16.3	14.8	15.2	4.5
Argentina........	4.5	2.5	2.2	1.1
France..........	0.6	0.5	0.9	3.8
Germany........	*	*	...	4.3
Other countries...	2.0	1.7	1.2	4.0

* Included in 'Other countries,' *Millers' Almanack* (1926), 286, 288.

[2] *Northwestern Miller*, April 11, 1923, p. 141.

[3] *Ibid.*, December 19, 1923, p. 1197.

[4] *Ibid.*, June 16, 1926, p. 1159.

[5] *Ibid.*, May 12, 1926, p. 564.

[6] *Ibid.*, April 11, 1923, p. 147.

charges.[1] While the domestic miller cannot produce as fine a flour as the Canadian, he can probably sell at lower prices. He can get a cheaper milling-mixture, cheaper labor and credit, and a better price on his by-products; being right on the ground he can give quicker and better service.[2]

As between the Canadian and the American mills the former undoubtedly have the advantage at present in the English market. In fact it is only by milling Canadian wheat for export that the American mills make any headway. The Canadians have the advantage of cheaper and better wheat. On the other hand, they have a comparatively small home demand, a much larger part of their output is exported, and their markets are less widespread than ours.[3] The American mills might easily increase their exports very considerably without any increase in mills and equipment and thereby secure a decreased cost per barrel, whereas any considerable increase in Canadian exports must necessarily mean an increase in overhead costs. Better coöperation among the American millers might reduce selling costs considerably, and a revision of freight rates might make it possible for the Mississippi Valley millers to mill Canadian wheat and ship it to Europe via the Gulf of Mexico. In general, however, the Canadian advantage is likely to continue. American exports of medium-grade flours are likely to decrease. But the English market demands mainly high quality flour of established brands, distinctive types and uniform quality. Hence, even though the total of American shipments continues to decline, those of certain American millers will continue to find a ready sale.

(2) *The Netherlands.* American flour has found a ready sale in the Netherlands for at least half a century. The

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[1] *Northwestern Miller*, December 19, 1923, p. 1197.

[2] *Ibid.*, November 25, 1925, p. 784.

[3] In 1923 Canada produced 19,075,000 barrels of wheat flour of which 11,198,000 or about 60 per cent was exported. (Dominion of Canada, Bureau of Statistics, *Report on the Flour Milling Industry in Canada* (1923), 21.)

density of the population, and the fact that the climate and soil are unsuited to wheat-growing, have made the country dependent on imported flour.[1] The United States was the chief source of supply until after 1900 when the German mills began to secure a share in the trade. The American flour, being stronger and better, was purchased to mix with a weaker domestic product. But the German mills could sell at lower prices, since they were aided by an export bounty. Most of their shipments into Holland were made from American wheat imported through Rotterdam, carried to Mannheim and other milling centers at a low rate, and then brought back as flour on a low export rate.[2]

Much of the flour imported from the United States in the past was of medium grade being mostly 'clears' and 'straights,' but the better grades have gained in recent years. A decade ago the Northwestern millers shipped seventy-five per cent of our exports; at present the Southwestern millers dominate the market. The Dutch bakers are said to prefer Kansas flour to Canadian, even though higher in price, because it requires a shorter fermentation period.[3] The decreased buying power after the Great War has caused an inincreased demand for lower grades but that is probably only temporary.

(3) *Germany.* In the years immediately following the Great War, Germany was one of the largest buyers of American flour. In 1923, for example, she imported 1,248,000 barrels. But this was an abnormal situation and even the 1926 imports of 657,000 barrels were far larger than those of prewar times. Before 1914 Germany's total purchases averaged only about 200,000 barrels annually and four fifths of these were trans-shipped to other countries from Hamburg.[4] During the same period they were exporting about a million (280-pound) sacks of wheat flour of their own production

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[1] Davis, *Flour and Wheat Trade*, 118.

[2] *Consular Reports*, 69:396–98 (July, 1902).

[3] *Northwestern Miller*, November 25, 1925, p. 784.

[4] Davis, *Flour and Wheat Trade*, 120–21.

and even larger amounts of rye flour. In the two decades before 1914 there had been a great advance in German milling. At Berlin, Hamburg, Mannheim, and Bremen there were large exporting mills and at the leading industrial centers other mills catering to the domestic trade. Their rapid growth was attributed to two things: the absence of organized grain speculation and the drawback system. Speculation being restricted by the Government, there were no large elevator systems, nor such a concentration of storage in marketing centers as in the United States. Hence, it was claimed, there was less opportunity for the manipulation of wheat prices and therefore, 'the milling business is less disturbed than where conditions at times prevail, as in the United States, to make wheat worth more to speculate with than it is to grind into flour.' Thus the miller had a sense of security in stable markets which did not exist in the United States.[1]

The second advantage — the drawback system — was a more tangible one. In effect it gave a bounty to German millers, through which they could import American wheat and still undersell American millers in many European markets. It varied slightly with different classes of wheat but under the law of 1906 was estimated to amount to $1.76 a barrel on the best grades of flour and the United States Department of Commerce estimated that there was a bounty of about forty-two cents a barrel concealed in it.[2]

The high development of milling in Germany is therefore a barrier to future exports to that country. Another difficulty lies in the nature of the demand. The Germans ate more rye bread than wheat before the War, even the better classes using a great deal of dark, coarsely bolted rye or wheat (or a mixture of the two). There has always been some demand for the highest-grade American flours, but the national taste and income have limited to small amounts the purchase of all but the lower grades.[3] The general decline in

[1] Davis, *Flour and Wheat Trade*, 72–73.

[2] *Ibid.*, 85–87.

[3] *Consular Reports*, 43:417–19 (December, 1893).

living standards after the Great War has intensified the situation. Even the low-grade flours will probably be milled at home, rather than imported, as soon as the Russian wheat is again available in normal quantities and at normal prices and the German mills are able to finance their wheat purchases.[1] During the period after the Armistice the inflow of foreign flour was facilitated by the suspension of the high import duties on flour, but these have again been restored. The drawback system has been revived. Germany is gradually building up an export trade.[2]

(4) *The Scandinavian countries.* Although Denmark is predominantly agricultural, the high development of dairying makes it an importer of both flour and cattle feeds. Then, too, Copenhagen, like Hamburg, is a great entrepot for northern Europe and one of its chief flour-distributing centers.[3] There are some fair-sized mills which formerly exported some flour, but their business has declined greatly in the face of foreign competition.[4] They buy American hard-wheat flours to blend with their own soft-wheat product and also low-grades to mix with rye flours. The American hard-wheat mills are still selling considerable quantities of their flour in Denmark, but in the last three or four years have lost ground to the Canadian mills.[5]

Norway, before the war, regularly imported half a million barrels of flour of which fully three fourths came from the United States. The Northwestern hard-wheat mills dominated the market with but little competition except from German and English mills. In spite of heavy duties there were but few domestic mills.[6] During the Great War, Norway suspended all duties on imported foodstuffs and estab-

[1] *Northwestern Miller*, June 20, 1923, p. 1255.

[2] *Ibid.*, December 23, 1925, p. 1172. See also, *ibid.*, July 8, 1925, p. 151, and June 20, 1923, p. 1255.

[3] *Monthly Consular and Trade Reports*, June, 1908, pp. 130–31.

[4] *Northwestern Miller*, July 8, 1925, p. 163; July 14, 1926, p. 127.

[5] *Ibid.*, April 18, 1923, p. 255; July 14, 1926, p. 127.

[6] Davis, *Flour and Wheat Trade*, 127–32; *Northwestern Miller*, March 25, 1925, p. 1182.

lished Government control.[1] The Government then began to buy Australian and Argentine flours because they were cheaper, but they have not proved as popular as the American brands and in recent years there has been a shift to Canadian flours. In 1925–26 the Canadian mills furnished three fourths of the imports. Government control ended July 1, 1927, and it is felt by some that the American flours may regain their former place.[2] On the other hand, there is a strong sentiment for Government ownership of the milling business and a beginning has been made by the purchase of the largest mill in the country. Such a policy, if continued, may lead to prohibitive duties against foreign flours.[3]

Of the three Scandinavian countries, Sweden is our least important market. Though it has twice the population of either Norway or Denmark, it is more largely self-sufficient in foodstuffs and has more large, modern mills. Imports are now about equal to those of pre-war times — that is, somewhat over 100,000 barrels annually — and Canada and the United States furnish about all of them, dividing the business equally. There is very little demand for high-grade flours and the duties are too high to permit large importations of low-grades. The bakers imported some American flour to blend with the domestic product and the millers have met the situation by importing strong American wheats for mixing purposes. This has caused a demand from the farmers for higher wheat-protection.[4] If American exports are to increase, it will be necessary to secure reciprocally lower duties and the American millers must aid the Swedish importers in educating the Swedish people to the use of better flours and whiter bread.

(5) *Finland.* The two-and-a-half million people of Finland

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[1] *Northwestern Miller*, July 13, 1921, p. 155.

[2] *Ibid.*, February 8, 1922, p. 605; April 9, 1924, p. 148; February 2, 1927, p. 462.

[3] Bengtson, *Norway, A Commercial and Industrial Handbook*, Bureau of Foreign and Domestic Commerce, Special Agents' Series, no. 96.

[4] *Northwestern Miller*, February 15, 1922, p. 707; February 22, 1922, p. 820.

are predominantly a rural population, but, since their industries are those of the forest and the sea, they have long been large importers of flour. Their friendly attitude toward the United States made them resume the importations of American flour, shut off by the Great War, as quickly as possible. In recent years they have purchased over a million barrels of wheat flour annually, beside large amounts of rye flour. Of this the United States has furnished roughly forty per cent. The per-capita consumption of flour has increased in recent years, the increase being mainly in coarsely ground, low-grade, hard-wheat flours.[1] Competition before the War was mainly from Argentine flour, but now the Canadian and German millers are most to be feared. Trade has been handicapped in recent years by the fluctuations in the Finnish mark, the unwillingness of the American millers to grant credit, and the lack of transportation facilities.[2] Purchases have mostly been made through middlemen at Hamburg, Rotterdam, London, or Copenhagen, though now some of the American mills have resident agents at Helsingfors.[3]

(6) *Other European markets.* Prospects for American flour in other parts of Europe need not detain us very long. Italy and the other Latin countries will always want some durum products, but generally speaking will import the wheat rather than the flour. Nor is there any prospect of a permanent trade with the new countries of central Europe. Latvia, Poland, Esthonia, and Lithuania are normally exporting rather than importing regions.[4] Czecho-Slovakia will continue to import, but the Hungarian and German mills, because of their proximity and their knowledge of the market, will have too great an advantage to be overcome by us.[5] The

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[1] Bureau of Foreign and Domestic Commerce, *Daily Reports* (August 10, 1921), 72.

[2] *Ibid.* Also by the imposition of duties on flours. But they are quite low. *Northwestern Miller*, June 6, 1923, p. 1052.

[3] The Washburn-Crosby Company apparently centralizes all its business in northern Europe at Oslo with sub-agents in the other countries.

[4] *Northwestern Miller*, March 1, 1922, p. 961.

[5] *Ibid.*, January 4, 1922, p. 37; February 1, 1922, p. 502.

trade with the Levant countries which was so large between 1919 and 1923, was also abnormal and has largely ceased. Excepting, perhaps, in Greece, we can find no permanent markets in that region.[1]

Our whole export trade to Europe seems, therefore, in a precarious state, facing, as it does, strong home competition in some countries and still stronger Canadian, Argentine, and Australian competition in others. In central Europe there has been a revival of protectionist sentiment leading to the establishment of high protective tariffs in Germany, Czecho-Slovakia, and Austria.[2] Our wheat prices and manufacturing costs are so high that we can hold trade only on quality and service, says *The Northwestern Miller.*[3] In the face of this, there have been frequent complaints of late, that American millers were not living up to their agreements in the matter of shipping on specified dates and also in the quality of their product. A continuation of this is likely to do irreparable injury in the most desirable markets.

(7) *Latin-American markets.* Many millers look for the future growth of American flour exports, if indeed there is to be any, in the direction of Latin America. At present, prospects are not particularly encouraging. Comparing our exports in 1923 with the average exports for the years 1910 to 1914 the Latin-American market shows a smaller percentage of increase than either Europe or the Orient. The principal markets are indicated in the table below.[4] We seem to be

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[1] *Northwestern Miller*, March 1, 1922, p. 952; May 3, 1922, p. 491; May 10, 1922; January 10, 1923, p. 148.

[2] *Ibid.*, April 28, 1926, p. 368.

[3] *Ibid.*, April 16, 1924, p. 248.

[4] United States exports of flour (in thousand barrels, by calendar years) to:

	1925	1924	1923	1922	1921
Cuba	1,198	1,187	1,090	1,090	1,066
Haiti	239	350	380	221	139
Mexico	201	388	436	295	353
Jamaica	143	161	188	155	196
Brazil	757	634	464	426	261
Venezuela	125	73	60	82	116

(*Millers' Almanack* (1927), p. 200.)

merely holding our own in the West Indies, Cuba being the largest market. In spite of a tariff preference for American flour of thirty-five cents per barrel, Canadian flour is getting a foothold there.[1] In the British West Indies the Canadian mills have had two thirds of the trade, and a recently concluded agreement for a preferential duty for Canadian flour is likely to decrease American imports still more.[2] The United States has some advantages in the West Indian market, however. Steamship service is better from American ports; our selling organization is better developed; and the American mills are better able to extend credit to the importers. Moreover, Canada can furnish only hard-wheat flours, while the market has something of a preference for the soft-wheat variety.[3]

Mexico has largely increased her purchases of American flour in recent years so that now perhaps one fifth of the total consumption is imported from us, these imports being mostly medium-grade hard-wheat flours which the native millers purchase to blend with their own soft-wheat flours.[4] In Central America our trade grows steadily with no serious rival to be feared. In South America our shipments to Brazil for a time declined somewhat owing to strong Argentine competition, but are now growing rapidly. In general the northern provinces buy American flour, the southern use the Argentine product almost exclusively, and the central territory is good fighting ground.[5] We have no flour trade with the southern countries of South America, which produce their own supplies or import from Argentina, but in the northern countries we are in a better position. In British Guiana Canadian flour is given the preference and in Venezuela we have lost ground to Canadian mills also.[6] In all the other countries of northern South America our flour dominates the market and our trade is increasing.[1]

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[1] *Northwestern Miller*, July 8, 1925, p. 158. *Consular Reports*, 47:556–562 (1895); 51:479–488 (1896).

[2] *Northwestern Miller*, January 13, 1926, p. 155.

[3] *Ibid.*

[4] *Ibid.*, May 30, 1923, p. 507.

[5] *Northwestern Miller*, December 19, 1923, p. 1205, 1211; *Monthly Consular and Trade Reports*, no. 336, pp. 135–38 (September, 1908).

[6] *Ibid.*, no. 345, p. 105 (June, 1909).

(8) *The Orient.* The expansion of the flour trade in the Orient — particularly in China, Japan, and the Philippines — is a remarkable phenomenon. Northern China has always grown wheat to some extent, but the transportation difficulties and the inertia of custom prevented the rice-eating population of central and southern China from using it. American shipments of flour to China seem to have begun soon after the opening of the treaty-ports, but were consumed mainly by the European population. The use of wheat flour by the masses of the native population seems to have been slight before about 1895. The new food was adopted very slowly, but the Great War brought a change in this as in other things. There seems to have been a distinct rise in the standard of living of even the lowest classes of laborers in the seaport towns which expressed itself in the desire for a more varied diet.

In part, this new demand for wheat flour was met by the rise of modern, large-scale milling in China. The first of these mills was built in 1897 at Shanghai, by American engineers and equipped with American machinery (as are most of the modern Chinese mills). There was a great expansion of milling immediately after the Great War, ten new mills being built in Shanghai alone. Future development is likely to take place in Manchuria, which is the principal wheat-growing region, with Harbin as the chief center.[2]

During the Great War and the years immediately following, China even exported small quantities of flour to Great Britain, central Europe, and the Philippines. An export trade with the neighboring countries is quite likely to continue. At the same time China's imports are increasing. This is partly the result of abnormal conditions brought on by famine and civil strife, but mainly it is due to the nature of the demand. The Chinese mills sell their best grades of flour to the upper classes and to the foreign population, export the medium grades, and sell the low grades to the masses. It may be said, in passing, that there is little bread baked by the poorer classes, the flour being mainly used for dumplings, noodles, and steamed foods of that type.[1] The Chinese mills have not the wheat supplies nor the technical skill to make flour of the very highest type, and they cannot for years expand to the point of supplying the demand for the low grades. In these two fields lie the opportunities of the American mills, and a great expansion of exports seems quite possible. In both fields, however, they must be prepared to face strong Canadian competition, and Japanese as well.

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[1] *Northwestern Miller*, May 2, 1923, p. 507.

[2] *Ibid.*, February 8, 1922, p. 619; April 5, 1922, p. 65; July 19, 1922,

With Japan our trade is declining greatly. The Japanese began to build modern flour-mills after the Russo-Japanese War (1904). There was a boom in flour-milling during the Great War, so that there are now fifty large modern mills with a capacity greater than is justified by the country's present demand. During the Great War export of flour, mainly to China, was begun, but seems to have made little progress because of American and Australian competition until 1925, when it jumped to over seven hundred thousand barrels. Whether this growth is to be permanent only time can tell. Japanese millers are handicapped by meager wheat crops and by the fact that their flour is not of the highest quality. Some foreign flour is imported by bakers to be mixed with the native product so as to give a whiter loaf.[2] On the whole it is probable that imports will disappear and that Japan will become self-sufficient in her flour supplies.

B. Changes in Distributing Organization and Problems in Transportation

In the old days many small mills had a part in the export business. Whenever an abundant local wheat crop made

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p. 256; February 21, 1923, p. 804; March 21, 1923, p. 1241; April 11, 1923, p. 141.

[1] *Consular Reports*, 55: 519–528 (December, 1897); 65: 524–530 (April, 1901).

[2] *Northwestern Miller*, May 30, 1923, p. 943.

possible a surplus of flour, they shipped to New York, where it was quite likely to be bought up by export houses and sent abroad. Some of the smaller mills established connections with a few importing houses in European countries and continue to sell to them. In either case no elaborate export organization is necessary. When, however, a company plans definitely on a large, widespread foreign business, the situation is changed. The tendency of recent years has been to confine exporting to a relatively small number of mills. In the Northwest probably not more than half a dozen mills have a well-established direct export trade. Exporting is becoming 'a distinct and separate branch of the trade.'[1]

The exporting mills do not confine themselves to one method of selling.[2] In the well-established markets of Europe they sell their best brands direct through agents in London, Hamburg, Amsterdam, Oslo, and Copenhagen, with sub-agents in the smaller cities. The agents sell to importers, wholesalers, large bakers, and even to millers (for mixing purposes). To the same markets the millers may sell flour through New York export houses, but this will be of a different grade or at least under different brands. Mainly, however, the export houses are used for the markets in less-developed regions where credit conditions are difficult to handle and the volume of business is too small to justify an exclusive agency. The export house may have a large business in that territory, be therefore better informed as to credit conditions, and can do an import as well as an export business. Nevertheless, the miller sometimes finds it necessary to send salesmen into such territory to help the export house build up business.

Before 1914 flour for the European market was usually sold 'C.I.F.' with credit for two or three months.[3] The miller, having loaded his flour, obtained a through bill-of-lading from the railroad company, drew on the flour-buyer, took his draft to the bank with documents attached, and sold it. He had his money and had no cause to worry. But the Great War caused a change in methods. Exchange fluctuated so greatly that the European buyer was no longer willing to take his chances with it as in the past, nor could he afford to buy for a long time ahead. Consequently he was not willing to take the chances of delay involved in a through bill-of-lading. His credit was no longer as good, so the American miller could not be sure that the draft would be paid. For all these reasons terms of sale changed. Old well-established firms in England and the Scandinavian countries were still sold 'C.I.F.,' though the time granted was shortened to seven days. For the other countries shipments went forward only on bank credits in New York; that is, the guarantee of a New York bank that it would honor the draft for the foreign buyer.

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[1] *Northwestern Miller*, February 13, 1924, p. 663.

[2] The discussion which follows is based mainly on information received from personal interviews with the export managers of the Washburn-Crosby Company and the Pillsbury Flour Mills Company.

[3] 'C.I.F.' — cost, insurance, freight. The price quoted by the seller includes the selling price at the mill, the marine insurance on the goods,

This, in turn, caused changes in the business organization of the export departments. Where formerly export business was handled at the mill, the tendency was after 1920 to concentrate at the port of shipment — for European business, New York City. The through bill-of-lading was dropped, the New York office seeing to the transfer of the goods from railroad to ship and 'shopping around' to secure the lowest possible ocean rates. Then, too, since the bank credit was for a definitely limited period, the New York office had to see that the flour was loaded on board the ship, or at least that the steamship bill-of-lading had been secured, before the credit expired. Instead of selling 'C.I.F.,' the milling companies now preferred to sell 'F.O.B. New York City' or

and the transportation charges to the foreign port named in the quotation. If the miller quotes a price 'F.O.B. New York' his obligations end when the goods are delivered on board the ocean steamer, the buyer taking out the insurance and paying the freight. 'F.A.S. New York' (free alongside ship) is the same as 'F.O.B. New York,' except that in the one case the shipper takes the risk of damage in the loading of the goods on board ship, in the other case the buyer must take the risk.

'F.A.S. New York,' though prepaying freight and insurance for the buyer's account. Thus the risks due to fluctuations in freight rates, insurance, and exchange were all transferred to the buyer.

In part, these changes were due to the abnormal conditions following the War, especially the deranged currency and credit conditions, so that the export business may be expected in time to go back to the old methods. But the concentration of export management at the seaport will probably prove permanent. There it is easier to keep in touch with trade conditions in foreign markets, and the mill can also carry stocks of flour at the seaport to fill emergency orders. It is not usual for the mill to carry stocks in foreign countries.

New York is not, of course, the only port through which European shipments are made. The Washburn-Crosby Company, for example, ships through Philadelphia, Baltimore, Norfolk, and Newport News as well. The millers frequently complain of the inadequate port facilities of New York City. In 1922 the export agent of the Millers' National Federation stated that Norfolk was the only Atlantic port which provided adequate machinery for loading flour on board ship.[1] The millers contrast this with the facilities provided for handling export wheat.

The millers feel that the railroads have discriminated in favor of wheat and against flour exports for at least two decades. Up to about 1899 the rates were practically the same for the two commodities; then the railroads began to offer lower rates on wheat for export, so that in 1899, for example, export wheat was carried from Chicago to New York for thirteen cents, whereas export flour had to pay twenty-one cents per hundredweight. The discrimination on shipments from Mississippi and Missouri River points was even greater. The Interstate Commerce Commission intervened in 1899, ordering that the difference in the export rates on wheat and flour should not exceed two cents per hundred pounds from Chicago to New York. The grain rates from Chicago were raised accordingly, to comply with this order, but the through (milling-in-transit) rates from points west of Chicago were changed to a less extent so that it would still cost the miller at Chicago, Milwaukee, or Indianapolis from three to seven cents more to carry the grain to his mill, and the flour from mill to seaboard, than it would cost the English miller who bought wheat at the same points.[1] While there was some justification for lower wheat rates in the lower cost of handling wheat, there can be no question that such a policy was disastrous to our export flour trade.

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[1] *Northwestern Miller*, February 15, 1922, p. 705.

In the same way the steamship companies discriminated against flour and in favor of wheat. The millers maintained that this also was unjustified.[2] Yet there is no question that frequently, in pre-war years, the carriers 'in order to obtain large tonnage, have, while holding up the rate on export flour, reduced the rate on wheat to a nominal charge.'[3] After the Great War this practice was resumed. In December, 1919, the United States Shipping Board attempted to readjust ocean freight rates in such a way as to increase the differential against flour from five cents a hundred pounds to forty-five cents. This the millers claimed would completely put an end to their export trade and, after a hard fight, they succeeded in getting the old arrangement restored.[4]

In March, 1924, the Interstate Commerce Commission issued an order certifying that there was enough American shipping available to justify the enforcement of Section 28 of the Merchant Marine Act of 1920. The effect of this would have been to apply the higher domestic railroad rates to all export traffic, except grain, which was not shipped out in American vessels. The law provided that this was to take effect only when, and at those ports at which the Commission certified that there was sufficient American tonnage available.[1] The millers denied that there was sufficient tonnage available at any Atlantic port but New York City. In any case shipments were often made to little-frequented ports and rush orders required to be shipped on the first boat available.[2] Since Section 28 included flour but excluded wheat, it meant that the millers might often be forced to pay the higher domestic railroad rate and thus be at an increased disadvantage compared to the European miller who shipped American wheat on the lower export rate. Moreover, as the millers understood it, the law did not apply to transit shipments through the United States. Accordingly flour from Winnipeg might be shipped to New York on American rails at a lower rate than flour from Minneapolis.[3]

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[1] United States Industrial Commission, *Report on Transportation*, IV, 71, testimony of Frank Barry, Secretary, Millers' National Federation.

[2] Davis, *Flour and Wheat Trade*, 15.

[3] Edgar, *The Medal of Gold*, 174.

[4] *Millers' Almanack* (1921), 37–39.

The millers' protest induced the President to order an indefinite suspension of Section 28 and they now hope that it may be repealed altogether. They maintain that they have loyally supported the American merchant marine, but do not want it built up at their expense. On the whole, it seems that neither the railroads nor the American steamship companies have taken a broad and sympathetic attitude toward the industry. It would seem that the interests of the country would be best served by the export of the manufactured product rather than the raw material. The offals would then be kept at home to feed our cattle and restore fertility to the soil. The trade would be much more likely to be held permanently, for the miller could hold trade with a high quality flour — with his trade-marks and good-will — in spite of increasing costs, where the exporter of wheat cannot. Considerations of cost of service and value of service should therefore give way before the larger problem of establishing our foreign markets. The miller can

[1] *Northwestern Miller*, April 9, 1924, p. 163.

[2] *Ibid.*, April 16, 1924, p. 236.

[3] *Ibid.*, April 9, 1924, p. 163.

build up a market for American wheat where no one else can. The railroads and the steamship companies should help, rather than hinder, him in doing it.

C. The Future of the Export Trade

The most marked characteristic of our export trade in recent years has been the great variations in volume from year to year.[1] These have been due to a variety of causes, including changes in wheat production and prices in this and other exporting countries, changes in buying power in the importing countries and changes in their capacity to mill their own flour. The abnormal war demand, and Russian absence from the field of competition, gave us, for a time, a larger share of the trade than in pre-war years, but exports are now at or below pre-war levels.

Recent declines have aroused discussion as to whether we may reasonably expect a continuance of flour exports in the future. Mainly this depends on whether the United States will continue to produce a surplus of wheat beyond her own needs. It is conceivable, of course, that our larger milling companies might continue in the export trade by milling imported grain, but only a few centers in the Great Lakes area would be in a position to do so. Most of our milling capacity is unfavorably located for such business.

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[1] Wheat and flour exports in recent years (000's omitted):

Year Ending June 30	Wheat (bus.)	Flour (bbls.)	Per Cent of Wheat Crop Exported as Flour	Per Cent of Flour Output Exported
1909–13, avg...	51,819	10,418	47.5	....
1914–18, avg...	141,852	15,469	32.9	13.3
1919.........	175,583	24,182	38.2	20.0
1920.........	122,431	21,651	44.3	16.9
1921.........	293,268	16,180	19.9	15.2
1922.........	208,231	15,796	25.4	12.9
1923.........	154,951	14,883	30.2	11.5
1924.........	78,793	17,253	49.6	13.3
1925.........	171,087	13,899	26.8	10.8
1926.........	63,600	9,543	40.3	7.6
1922–26, avg...	135,332	14,275	32.2	10.6

(United States Department of Commerce, *Yearbook* (1922), 196; *ibid.* (1926), 192.

As to whether the United States will continue to produce a wheat surplus, experts are at variance. Dr. Alonzo Taylor, analyzing the situation, thinks that the surplus will disappear. The United States has reached the point where she must abandon frontier methods of cultivation for crop rotation, diversified agriculture, and more intensive cultivation. A decreasing acreage is indicated.[1] Considering only long-run tendencies in production and consumption and disregarding the abnormal conditions brought on by the Great War, we find much to support this view. On the one hand, American consumption has been steadily increasing, due to the increase in population. How far and how fast population will increase in the future is, of course, a problem. The recent restriction of immigration and the declining birth-rate in the face of harder economic competition and rising standards of living indicate that, while population will continue to increase, the rate of increase will decline.

The increase of population will mean an increase in home consumption of flour unless the per-capita consumption decreases greatly. Recent studies of the Stanford Food Research Institute indicate that between 1904 and 1923 there was a decline of twenty-one per cent in the per-capita flour consumption of the United States. Had we maintained the 1904 level, we should have used considerably more than our total actual flour production and the export surplus would have disappeared.[2] The Millers' National Federation, alarmed at this situation, appointed a committee in 1926 to consider ways and means of combating this trend. To this committee Dr. Taylor stated his opinion that the decline of flour consumption had reached and passed a minimum and was now on the up-grade.[3]

Assuming a stabilized per-capita consumption and an increasing population, some have inferred that our export surplus will soon disappear. 'In comparatively few years, if present trends continue, we shall be eating all that we produce.'[1] But against this view there are certain things to be said. Taking a long-time view we may say that wheat acreage has increased from fifteen million acres in 1866 to fifty-two million in 1899 and to seventy-five million under the stimulus of war needs in 1919. Since that year there has been a decline to fifty-eight million in 1923.[2] The increase in the war years was brought about, in part, by decreasing the acreage devoted to other crops, but in part it was an absolute increase in total acreage. Lands since then allowed to go out of use can again be brought under tillage. Crop yields may be increased by intensive cultivation, by the use of fertilizers, and by crop rotations. This would necessarily mean, however, higher wheat costs and prices. It is doubtful whether American millers have sufficient advantage over those of other rival countries to enable them to compete in the world's markets against this disability. There is much more hope in the possibility of improving the quality of wheat production. As things stand our wheat supply, except in a very unusual year, 'does not contain enough prime hard wheat to enable us to export strong flour comparable and competitive with Canadian flour in foreign markets.' [3] But we produce a great deal of semi-hard wheat, due to poor seed or bad seasons, for which there is no milling demand and which is usually exported as wheat. If these inferior wheats could be replaced by hard wheats of good quality our millers would be in a better position to face foreign competition.[4]

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[1] *Northwestern Miller*, June 27, 1923, p. 1371.

[2] Working, *The Decline of Per Capita Consumption of Flour in the United States*, Food Research Institute, Wheat Studies, II, no. 9.

[3] *Northwestern Miller*, November 3, 1926, p. 453.

Even though our wheat surplus continues, it does not necessarily follow that we shall continue to export flour. Our European markets, especially, depend very largely on the rapidity of the recovery of the European mills from war disorganization and on the extent to which the northern countries will insist on importing wheat rather than flour. The present tendency, as we have seen, is for both wheat and flour exports to decline. The time may come, unless there are considerable changes in American agriculture favorable to the growing of high-grade hard wheat, when we shall cease flour export altogether. A removal of the American protective duties on flour might conceivably accelerate the process by causing a decline in American milling under sharp Canadian competition. A removal of the duty on wheat making possible a greater use of Canadian hard wheat by American mills presumably would increase our flour exports. As things now stand our exports consist mainly of three types: 'clear flours exported because of a limited market at home,' 'medium-grade straight flours from wheats whose qualities do not meet current American specifications,' and high-grade trade-marked 'patents,' straights, and clears all made from hard wheats.[1] The exportation of the first two classes seems likely to end very soon, the last may continue indefinitely, especially if the millers can secure high-grade Canadian wheat to supplement native supplies.[2]

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[1] Ball and others, 'Wheat Production and Marketing,' United States Department of Agriculture, *Yearbook* (1921), 159.

[2] United States Department of Agriculture, *Yearbook* (1923), 131–33.

[3] Taylor, *American Importation of Canadian Wheat*, 6.

[4] *Northwestern Miller*, April 2, 1924, p. 54.

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[1] Taylor, *American Importation of Canadian Wheat*, 7.

[2] See also the discussion of export possibilities for the Pacific Coast mills, pp. 210–212.

CHAPTER XII

CONCLUSION

In a survey covering the history of one of the major industries of a great nation, many important developments must necessarily be treated either very briefly and superficially or not at all. A manageable number of topics must be selected and the rest rejected. Thus we have given only slight consideration to the labor problems of the flour industry. Questions of the effect of technical changes in the industry on the productivity of its labor, of the supply of labor and the efforts made to provide for it, were consciously omitted. So, too, were the problems connected with prices and costs, of wages, profits, and their inter-relations. The problems of the relation of the Government to the industry, such as the tariff, war-time control, the possibilities of State ownership as illustrated in North Dakota, were given only scant attention. Nevertheless, on the basis of what has been presented, we can make certain generalizations and draw certain conclusions as to the changes going on within the industry.

1. Most obvious have been the changes in the power used in the industry. The hand-mill of the self-sufficient pioneer gave place, as the country grew more settled, to mills operated by animal power — horses, mules, or oxen. These in turn were superseded by water-power mills and, as the scale of production made larger powers necessary, by steam-plants. Steam-mills in certain sections of the country have given way to plants operated by electric power coming from some central generating plant. This generating plant may be a water-power development, as at Buffalo, or may be exploiting cheap fuel oils as in Kansas. It is not implied, of course, that these varieties of power succeeded each other in chronological sequence, nor that the industry in its devel-

opment in each separate region made use of all of them in turn. What powers are used depends so largely on local conditions. As has been shown, the survival of the hand-mill and the scarcity of power-mills in certain colonies was due in part to the plentifulness of cheap negro labor. In certain sections of the Mississippi Valley where water-powers were scarce the steam-mill followed the horse-mill. Where the mills are located in juxtaposition to water-power it is probably more desirable to use the water-power directly; if the mills are at some distance from the power, it can often be profitably used through electric motors. Perhaps we may say that the latter is the type of power which tends to be used in the best mills to-day.[1]

2. And then the industry illustrates certain changes in the relation of producers and consumers. Probably the stages of manufacture as ordinarily discussed do not apply to this industry since there is no 'handicraft' in milling. Moreover, there is a use of mechanical power in the early undeveloped form of the industry, whereas we ordinarily associate mechanical power only with the final centralized stage. Yet we can trace a certain development in this matter. The earliest mills were custom mills which received the farmer's grain and ground it, returning to him the identical grain less the miller's toll. The farmer furnished the raw materials and owned the finished product. So far as he was concerned, it was production for use and not for sale.

The miller, of course, had the problem of disposing of the toll flour so far as there was a surplus over what he needed for himself. Where a local market was available this could be accomplished by a direct sale to the consumer. After a time the miller began to buy wheat and manufacture for sale in distant markets. To do this he found it necessary to make use of middlemen: commission merchants, brokers, and other types of wholesalers. The older methods of dealing with the consumer disappeared. In some sections the 'exchange mill' marked the transition from the old to the new. In this, the farmer bringing his grain to be ground, received back, not the identical grain he brought, but an equivalent amount in flour.

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[1] More than half the power used in merchant mills is now electric power. The use of electric power is increasing while that of all other powers is decreasing. (*Census of Manufactures*, 1925.)

3. Flour-milling illustrates for us two contradictory tendencies of modern industry: the growth of concentration and the continuance of dispersion; the movement toward large-scale production and the survival of the small unit. A few very large corporations are producing a large and increasing share of our total output. The very small mills are decreasing in numbers but it is still a disputed question whether the five-thousand-barrel mill has any real advantages over the five-hundred-barrel mill — in costs of production, at least.

4. The reasons which cause an industry to be localized in a given region or area are illustrated by the development of flour-milling. Cheap power, abundant and superior supplies of raw materials, technical superiority in manufacturing methods, inventions, advantages in organization, railroad favors, advertising — all had their part in building up the industry at certain points and causing a decline at others. Because of its close dependence on supply of raw materials, the industry illustrates the general westward movement of manufactures in this country. And here a third paradox emerges. We have two apparently contradictory tendencies, as a result of which the industry is being drawn westward into the wheat areas and also eastward toward the great consuming centers. The struggle of the future is likely to be between Buffalo, at the entrance to the chief consuming area in the United States, and Kansas City, the gateway of the chief wheat-growing area.

5. The development of marketing methods may also be illustrated from the milling industry. In that field the dominant tendency seems to be for the millers to attempt to eliminate one or more of the middlemen. In the domestic trade the mills started with the commission house, then

developed the broker and the miller's agent and ended by establishing their own branch officers and sales agencies. In foreign trade the export house has been largely superseded by direct contact with foreign dealers, through agents resident in foreign countries. Thus there have been many changes, yet complexity rather than simplification seems to be the net result.

6. The development of the formal organization of the trade also proceeds along lines developed in other fields of manufacture. The industry begins with the individual entrepreneur operating a little custom mill for the neighborhood trade. Later, the merchant mill, because it required more capital, came to be operated by partnerships. The large-scale modern enterprise, with extensive storage facilities, and carrying large stocks of raw materials and finished products, necessarily requires very large capital, hence it adopts the corporate form of organization. Following that, we have seen, in recent years, the development of various compound organizations (of which the holding company is the most common) which control groups of mills — often in different wheat regions and different consuming areas, thus securing the advantages of horizontal combination. Usually these larger units control elevator systems, both country and terminal. They also attempt to create their own distributive organization. To this extent they are examples of integration also.

7. Side by side with this, there has been a development of business association which has tended to unite the millers of each locality, State, or region, with their fellow millers. These associations are federated in a single national organization — the Millers' National Federation.

8. Though the miller is more of a business man and less of an artisan as the years pass, it is also true that the industry tends more and more to a scientific basis. Old rule-of-thumb methods are disappearing; the modern mill is laboratory controlled.

9. Finally, we note that flour-milling history illustrates

the methods by which a new and growing industry secures its supplies of capital. In part, capital is transferred from older and decaying industries, or milling centers. In part the industry gets its capital from accumulations in the mercantile end of the business. For example, transfers of capital were made from the flour-selling houses in the East to the mills in the West. But the chief source of industrial capital in this industry is, after all, the reinvested profits of the men in it.

10. We end, as we began, with the rivalry of the centers. The struggle between the country millers and those of the urban centers, which we noted in the colonial period, has its counterpart in our own day in each area. But mainly it has been superseded by greater, more fiercely contested conflicts: between the centers in each wheat or consuming area aspiring to dominance in that area; between the chief centers in the different areas, and between centers representing different countries and even different continents.

THE END

BIBLIOGRAPHY

I. MANUSCRIPT SOURCES

Beall Account Books. Accounts of Captain Thomas Beall of Georgetown, 1794–1811. 3 vols. Library of Congress.

Crenshaw and Company, Petersburg, Virginia, Ledger of Accounts, 1770. Library of Congress.

Daybook of a Philadelphia Merchant, 1770–88. Historical Society of Pennsylvania Library.

Gibbon's Account Books, 1719–34. Library of Congress.

Hale Papers, 1879–89. Minnesota State Historical Society Library.

Millers' and Coopers' Account Book, 1704–05. Historical Society of Pennsylvania Library.

Philadelphia Custom House Papers, 1750–61. 4 vols. Historical Society of Pennsylvania Library.

Port Records of Annapolis, 1756–76. Maryland Historical Society Library.

Virginia Flour Inspection Reports, 1785–1865. Virginia State Library.

II. PRINTED SOURCES

A. Primary or Chiefly Primary

1. *Government Publications, National, State and Local*

American State Papers, Commerce and Navigation, 2 vols. Washington, 1834.

Andrews, I. D., *Trade and Commerce of the British North American Colonies*. Thirty-Second Congress, 1st Session, Senate Ex. Doc. 112. Washington, 1853.

Beck, L. C., *Report on the Breadstuffs of the United States*, their relative value and the injury which they sustain by transport, warehousing, etc. United States Patent Office, *Annual Report*, 1848, pp. 245–73. Washington, 1849.

Beck, L. C., *Second Report on the Breadstuffs of the United States*. United States Patent Office, *Annual Report*, 1849, Agriculture, pp. 49–82. Washington, 1850.

Census of 1840, *Compendium*. Washington, 1841.

Census of 1850, *The Seventh Census of the United States*. Washington, 1853.

Census of 1860, *Manufactures in the United States in 1860.* Washington, 1865.

Census of 1860, *Agriculture in the United States in 1860.* Washington, 1864.

Census of 1870, Vol. III. *Statistics of the Wealth and Industry of the People of the United States.* Washington, 1872.

Census of 1880, Vol. II. *Report on the Productions of Agriculture.* Washington, 1883.

Census of 1880, Vol. III. *Report on the Manufactures of the United States.* Washington, 1883.

Census of 1890, *Report on Manufacturing Industries*, Part I. Washington, 1895.

Census of 1890, *Report on the Statistics of Agriculture.* Washington, 1895.

Census of 1900, Vol. VI. *Agriculture*, Part II. Washington, 1902.

Census of 1900, Vol. IX. *Manufactures*, Part III. Washington, 1902.

Census of 1910, Vol. IX. *Manufactures.* Washington, 1912.

Census of 1920, Vol. X. *Manufactures.* Washington, 1923.

Census of Manufactures, 1905. Part III, *Selected Industries.* Washington, 1908.

Census of Manufactures, 1914. Part II, *Reports for Selected Industries.* Washington, 1919.

Census of Manufactures, 1919.

Census of Manufactures, 1921.

Census of Manufactures, 1923.

Commerce and Navigation Reports, United States, 1821–60.

Commissioner of Agriculture, United States, *Reports*, 1862–91.

Commissioners to the Paris Universal Exposition, United States. Hazard, G. S., and Ruggles, S. B., *Report on Cereals.* Washington, 1869.

Coxe, Tench, Statement of the Arts and Manufactures of the United States for the Year 1810. *American State Papers, Finance*, Vol. II.

Department of Commerce and Labor, United States, Bureau of Manufactures, Special Agents Series: Davis, M. H., *Flour and Wheat Trade*, in European Countries and the Levant. Washington, 1909.

Department of Commerce, United States, Bureau of Foreign and Domestic Commerce, *Consular Reports*, Vols. 32–75 (1890–94).

Department of Commerce, United States, *Daily Trade Reports*, 1920–24.

Department of Commerce, United States, *Monthly Consular and Trade Reports*, 1908.

Department of Commerce, United States, *Year Book*, 1922–27.

Department of the Treasury, United States, *Monthly Summary of Commerce and Finance*, Vol. VII (1900); No. 7, pp. 1955–2075, 'The Grain Trade of the World.'

Dominion of Canada Bureau of Statistics, Report on the Flour-Milling Industry in Canada (mimeographed). Ottawa, 1925.

Federal Trade Commission, United States, *Report on Flour Milling and Jobbing*. Washington, 1918.

Federal Trade Commission, United States, *Commercial Wheat Flour Milling*. Washington, 1920.

Federal Trade Commission, United States, *Report on the Grain Trade*. 5 vols. Washington, 1920.

Federal Trade Commission, United States, *Report on the Wheat Flour Milling Industry*. Washington, 1924.

Federal Trade Commission Report, *Competitive Conditions in Flour Milling*, Washington, 1926.

Food Administration, United States, *Policies and Plan of Operation; Official Statement.*

Grain Corporation, United States, *Book of Information*, Washington, 1919.

Industrial Commission, United States, *Report on Transportation*, Vol. IV. Washington, 1901. *Report on Trusts and Industrial Combinations*, Vol. XIII. Washington, 1901.

Interstate Commerce Commission, United States, *Reports*, 1892–1926.

Labor Statistics, United States, Bureau of, *Handbook of American Trade Unions.*

Maryland, *Journals of the Senate and House of Delegates*, 1796–1825.

Massachusetts, *Acts and Resolves*, Public and Private, of the Province of Massachusetts Bay, Vol. III, Boston, 1878; Vol. IV, Boston, 1881.

Massachusetts, *Statistics*, 1845. Boston, 1846.

Massachusetts, *Industry*, 1855. Boston, 1856.

Massachusetts, *Industry*, 1865. Boston, 1866.

Massachusetts, *Records of the Governor and Company of Massachusetts Bay in New England.* Edited by U. B. Shurtleff, Vols. I–V, 1628–86. Boston, 1853–54.

Michigan, *Annual Reports of the Secretary of State.... Relating to Farms and Farm Products.* Lansing, 1877–87.

Michigan Board of Agriculture, *Annual Report*, 1872. Lansing, 1872.

Minnesota Bureau of Labor Statistics, *Third Biennial Report* (1891–92), Part II, Inventions in Flour-Making Machinery and the Price of Wheat Flour. St. Paul, 1892.

Minnesota Bureau of Labor Statistics, *Eighth Biennial Report* (1901–02). St. Paul, 1902.

Minnesota Commissioner of Statistics, *Annual Reports*, 1859–61.

Minnesota Executive Documents, 1860–1902.

Minnesota Railroad and Warehouse Commission, *Biennial Report of the Chief Inspector of Grain.* (Annual up to 1922.) 1902–27.

Minnesota Session Laws, 1871–93.

New York City, *Minutes of the Common Council* of the City of New York, 1675–1776. 8 vols. New York, 1905.

New York State, Department of Labor, Bureau of Labor Statistics, *Twentieth Annual Report.* Albany, 1903.

New York Colonial Documents, *Documents Relative to the Colonial History of the State of New York.* 15 vols. Albany, 1853–87.

New York House of Delegates, *Journal.*

New York, *Journal of the Legislative Council of the Colony of New York*, 1668–1783.

New York, *Calendar of Council Minutes.* New York State, *Library Report*, 1902. Albany, 1903.

New York, *Messages from the Governors*, 1683–1906. C. Z. Lincoln, Editor. 11 vols. Albany, 1909.

New York, *Van Rensselaer Bowier Manuscripts.*

Pennsylvania, *Archives*, Vols. I–IX.

Pennsylvania Laws. A. J. Dallas, Editor. *Laws of the Commonwealth of Pennsylvania.* 2 vols. Philadelphia, 1793–97.

Rhode Island, *Colonial Records.*

Tariff Commission, United States, *Report*, 1882. Washington, 1882.

Tariff Commission, United States, *Wheat and Wheat Products.* A Report to the President of the United States. Washington, 1924.

Virginia, *House of Delegates Journals.*

Virginia, *Hening's Statutes of Virginia.* 13 vols. Richmond, 1819–23.

2. *Trade and Agricultural Journals, Newspapers, Periodicals, and Trade Association Publications*

The American Farmer (First Series), Vols. I–X. Baltimore, 1819–29.

The American Federation of Labor, *Proceedings of the Annual Conventions*, 1883–1926.

The American Manufacturers Association of Products from Corn, *The Facts Concerning Mixed Flour.* Chicago, 1915.

The American Miller, Vols. 9–15. Chicago, 1881–87.

Boston Board of Trade and Merchants' Exchange, *Annual Reports.* Boston, 1854–81.

Buffalo Merchants' Exchange, *Annual Reports.* Buffalo, 1885–92, 1903–09.

Carry-On. Published by the Employees of the Pillsbury Flour Mills Company.

Chicago Board of Trade, *Annual Report.* Chicago, 1880–1918.

Cincinnati Chamber of Commerce and Merchants' Exchange, *Annual Reports.* Cincinnati, 1855–85.

The Commercial and Financial Chronicle. New York, 1867–84.

The Cultivator, Vols. VI–VIII. Albany, 1849–51.

Duluth Board of Trade, *Annual Report of the Trade and Commerce of Duluth.* Duluth, 1886–93.

The Falls Evening News. St. Anthony and Minneapolis, 1857–59.

The Farmers' Dictionary. New York, 1846.

The Farmers' Register. Petersburg, Va., 1834–39.

The Genesee Farmer, Vol. XIV. Rochester, 1853.

Hazard's *United States Commercial and Statistical Register*, Vols. I–VI. Philadelphia, 1839–42.

Hunt's Merchants' Magazine. The Merchants' Magazine and Commercial Review, Vols. 1–63. New York, 1839–69.

Kansas City Board of Trade, *Annual Statistical Report.* Kansas City, 1877–87, 1891–1914.

Kansas City Board of Trade, *The New West*, Its Resources, Interests, Commerce, and Agricultural Needs. Kansas City, 1873.

The Michigan Farmer, Vols. I–VIII. Lansing, 1843–51.

The Miller and Manufacturer, Vols. I–II. Cincinnati, 1883–85.

The Millers' Almanack and Trade Yearbook. Minneapolis, 1909–27.

The Millers' Journal, Vols. XIII, XVI–XXII. New York, 1880, 1882–85.

The Millers' National Federation, *Bulletin*. Chicago, 1924–26.

Milling (formerly *The Millstone*), Vols. I–IV. Indianapolis and Chicago, 1892–94.

Milwaukee Chamber of Commerce, *Annual Reports*. Milwaukee, 1892–1915.

Minnesota State Federation of Labor, *Convention Reports*, 1897–1912.

Minneapolis Board of Trade, *Annual Reports*. Minneapolis, 1876–80.

Minneapolis Chamber of Commerce, *Annual Reports*. Minneapolis, 1883–1927.

Minneapolis Civic and Commerce Association, *Minneapolis, Financial Center and Gateway of the Northwest*. Compiled for Presentation to the Federal Reserve Bank Organization Committee. Minneapolis, 1913.

Minneapolis Civic and Commerce Association, *Minneapolis, The Market of the Northwest*. Brief Compiled for Presentation to the Federal Farm Loan Board. Minneapolis, 1916.

Minneapolis Civic and Commerce Association, *Rail-Lake-Rail Rates*, Twin Cities vs. Duluth. Minneapolis, 1913.

The Minneapolis Journal. Minneapolis, 1920–27.

The Minneapolis Tribune. Minneapolis, 1870–74, 1920–27.

The Modern Miller, Vols. XXIV–LIV. St. Louis, 1898–1927.

Niles Weekly Register, Vols. I–XV. Baltimore, 1811–25.

The Northwestern Miller, Vols. III–CLII. Minneapolis, 1876–1927.

The Operative Miller, Vols. XIV to date. Chicago, 1909–27.

The Plough-Boy, Vols. I–II. Albany, 1819–21.

The Plough, the Loom and the Anvil, Vol. III. Baltimore, 1850.

The Prairie Farmer, Vols. X, XII–XIV. Chicago, 1850–54.

The Roller Mill, Vols. X–XXI. Buffalo, 1891–1903.

The Saint Anthony Express. St. Anthony, 1851–55.

The Saint Louis Merchants' Exchange. *Annual Reports*. St. Louis, 1880–1918.

The Saint Paul Pioneer Press. St. Paul, 1878–81.

The Samson Scrap Books. A collection of clippings from Rochester (N.Y.) newspapers. Reynolds Library, Rochester.

Stevens, J. A., Editor, *Colonial Records of the New York Chamber of Commerce*, 1768–84. New York, 1867.

The United States Miller, Vols. VII–XIV, XVIII–XXII. Milwaukee, 1879–85, 1889–94.

3. *Scientific Studies*

Alway, C. F., *The Effect of Bleaching upon the Quality of Wheat Flour*. Nebraska Agricultural Experiment Station Bulletin No. 102. Lincoln, 1907.

Fitch, Asa, *An Essay upon the Wheat Fly and Some Species Allied to it*. Transactions of the New York State Agricultural Society, Vol. V. Albany, 1846.

Fitch, Asa, *The Hessian Fly, its History, Character, Transformation, and Habits*. Albany, 1846.

Hale, Worth, *The Bleaching of Flour and the Effect of Nitrites on Certain Medicinal Substances*. United States Public Health Service, Hygienic Laboratory, Bulletin No. 68. Washington, 1910.

Jacobs, B. R., and Rask, O. S., 'Laboratory Control of Wheat Flour Milling,' *Industrial and Engineering Chemistry Journal*, Vol. 12, pp. 899–903. Easton, 1920.

Jago, William, *The Chemistry of Wheat Flour and Bread and the Technology of Bread Making*. Brighton, 1886.

Ladd, E. F., and Stallings, E. L., *Bleaching of Flour*, North Dakota Agricultural Experimental Station Bulletin No. 72, pp. 219–35.

Macfarlane, T., *On the Analysis of Wheaten Flour*. Royal Society of Canada, *Proceedings and Transactions*, Series 2, Vol. 12, Sec. 3, pp. 57–64. Ottawa.

Saunders, C. E., *Quality in Wheat*. Canadian Department of Agriculture, Central Experiment Station Bulletin No. 57. Ottawa, 1907.

Snyder, H. P., *Flour Bleaching*. Minnesota Agricultural Experiment Station Bulletin, Vol. III, pp. 101–43.

Woods, C., and Snyder, H. P., *Cereal Breakfast Foods.* United States Department of Agriculture, Farmers' Bulletin No. 249. Washington, 1906.

4. *Reminiscences, Travel, and Description*

Adams, Mrs. Ann, Early Days at Red River Settlement and Fort Snelling. Minnesota Historical Society, *Collections,* Vol. VI, 75–116. St. Paul, 1894.

Barber, J. W., and Howe, Henry, *Historical Collections of the State of New York.* New York, 1841.

Bond, J. W., *Minnesota and its Resources.* New York, 1853.

Bradford, William, *History of Plymouth Plantation,* 1606–46. Edited by W. T. Davis. Original Narratives of Early American History Series, Vol. VI. New York, 1908.

Brissot de Warville, J. P., *New Travels in the United States of America.* 2d edition. London, 1794.

Brush, J. C., *A Small Tract,* entitled a Candid and Impartial Exposition of Various Opinions on the Subject of the Comparative Quality of the Wheat and Flour in the Northern and Southern Sections of the United States. Washington, 1820.

Budd, Thomas, *Good Order Established in Pennsylvania and New Jersey in America.* Being a True Account of the Country with its Produce and Commodities there made in the year 1685. New edition by Edward Armstrong. New York, 1865.

Chambers, William, *Things as they are in America.* Philadelphia, 1854.

Christian, G. H., Early Roller Mills and their Treatment by the Railroads. In Holcombe, R. I., and Bingham, W. H., *Compendium of the History and Biography of Minneapolis and Hennepin County.* Chicago, 1914.

Cist, Charles, *Cincinnati in 1841.* n.p. n.d.

Cist, Charles, *Sketches and Statistics of Cincinnati in 1851.* n.p. n.d.

Cist, Charles, *Sketches and Statistics of Cincinnati in 1859.* n.p. n.d.

Coles, B. W., A Memoir on the Subject of the Wheat and Flour of the State of New York. Read at a sitting of the New York County Agricultural Society, February 17, 1820. *The Plough-Boy,* Vol. I, 403–04, 412–15. Albany, 1820.

Drake, Darrell, *Natural and Statistical View, or Picture, of Cincinnati and the Miami Country.* Cincinnati, 1815.

Dwight, Timothy, *Travels in New England and New York.* 4 vols. New Haven, 1821.

Hall, C. C., Editor, *Narratives of Early Maryland,* 1633–84. Original Narratives of Early American History Series, Vol. X. New York, 1910.

Henry, T. C., The Story of a Fenceless Winter Wheat Field. Kansas State Historical Society, *Collections,* Vol. IX (1905–06), 502–06.

Hildreth, S. P., *Pioneer History.* Being an account of the First Examination of the Ohio Valley and the Early Settlements of the Northwest Territory. Cincinnati, 1848.

Hill, J. J., History of Agriculture in Minnesota. Minnesota Historical Society, *Collections,* Vol. VIII, 275–90. St. Paul, 1848.

Howe, Henry, *Historical Collections of Ohio.* Cincinnati, 1847.

Howe, S. F., *The Commerce of Kansas City in 1886.* Kansas City, 1886.

Hull, John, The Diaries of John Hull, Mint-Master and Treasurer of the Colony of Massachusetts Bay. *Transactions and Collections of the American Antiquarian Society,* Vol. III. Boston, 1857.

Jameson, J. F., *Narratives of New Netherland,* 1609–64. Original Narratives of Early American History Series. New York, 1909.

Johnston, J. F. W., *Notes on North America, Agricultural, Economical, and Social.* 2 vols. Edinburgh and London, 1851.

Kalm, Peter, *Travels into North America.* Translated by J. R. Forster. 3 vols. Warrington and London, 1770–71.

La Rochefoucauld-Liancourt, Duc de, *Travels through the United States of North America,* the country of the Iroquois and Upper Canada in the years 1795, 1796, and 1797. 2d edition. Translated by H. Neuman. 4 vols. London, 1800.

Mease, James, *Pictures of Philadelphia.* Philadelphia, 1811.

Mease, James, *Pictures of Philadelphia for 1824.* Philadelphia, 1824.

Mereness, N. D., Editor, *Travels in the American Colonies*. New York, 1916.

Morrison, A. J., Editor, Letters of Roger Atkinson, 1769–76. *Virginia Magazine of History and Biography*, Vol. XV (1908), 345 ff.

Myers, A. C., *Narratives of Early Pennsylvania, West New Jersey, and Delaware*, 1630–1707. Original Narratives of Early American History Series, Vol. XII. New York, 1912.

Pillsbury, C. A., American Flour. In Depew, C. M., *One Hundred Years of American Commerce*, Vol. I, 266–73. New York, 1895.

Prescott, P., Autobiography and Reminiscences of Philander Prescott. Minnesota Historical Society, *Collections*, Vol. VI, 75–116. St. Paul, 1894.

Proud, R., *The History of Pennsylvania in North America*. Written principally between the years 1776 and 1780. 2 vols. Philadelphia, 1798.

Schmidt, C. B., Reminiscences of Foreign Immigration Work for Kansas. Kansas State Historical Society, *Collections*, Vol. IX (1905–06), 485–97.

Schoepf, J. D., *Travels in the Confederation*, 1783–84. Translated and edited by A. J. Morrison. 2 vols. Philadelphia, 1911.

Sparks, Jared, Baltimore. *The North American Review* Vol. XX (1825), 99–138.

Stevens, J. H., *Personal Recollections of Minnesota and its People and Early History of Minneapolis*. Minneapolis, 1890.

Thwaites, R. G., Editor, *Early Western Travels*, 1748–1846. 32 vols. Cleveland, 1904–07.

Varle, Charles, *A Complete View of Baltimore*. Baltimore, 1833.

Warden, D. B., *A Statistical, Political and Historical Account of the United States of North America*. 3 vols. Edinburgh, 1819.

Winterbotham, Wm., *An Historical, Geographical, Commercial and Philosophical View of the American United States* and *of the European Settlements in America and the West Indies*. 4 vols. 2d edition. London, 1799.

Winthrop's Journal History of New England, 1630–49. Edited by J. K. Hosmer. Original Narratives of Early American History Series. New York, 1908.

Winthrop Papers. Massachusetts Historical Society, *Collections.* 5th Series, Vol. VIII. Letters of John Winthrop, Jr., and other members of the family written between 1626 and 1676.

5. *Atlases, Gazetteers, etc.*

Appleton's Annual Cyclopædia, Vol. VI (1881). New York, 1881.

Bradstreet, J. M., and Sons, *Gazetteer of the Manufactures and Manufacturing Towns of the United States.* New York, 1866.

Edwards, R., *Statistical Gazetteer of the State of Virginia.* Richmond, 1855.

Hardesty's *Historical and Geographical Encyclopædia.* Richmond, 1885.

Haskel, D., and Smith, J. C., *Descriptive and Statistical Gazetteer of the United States of America.* New York, 1848.

Illinois State Gazetteer and Business Directory, for the years 1864–65. Chicago, 1864.

McCulloch, J. R., *A Dictionary of Commerce and Commercial Navigation.* With a supplement by A. J. Wilson. London, 1882.

Martin, Jos., *Gazetteer of Virginia.* Charlottesville, 1835.

Maryland Pocket Annual. Printed by Jeremiah Hughes. 1834–43. Annapolis, 1834–43.

Scott, Jos., *A Geographical Dictionary of the United States of North America.* Philadelphia, 1805.

Scott, Jos., *The United States Gazetteer.* Philadelphia, 1795.

6. *Miscellaneous*

Bureau of Chemistry, United States Department of Agriculture, *Service and Regulatory Announcements*, 1920. Washington, 1920.

Commons, J. R., Editor, *Documentary History of American Industrial Society.* 11 vols. Cleveland, 1910–11.

Evans, Oliver, Petition to the Maryland Legislature and Patent Granted to him by the State of Maryland. *United States Patent Office Reports*, 1849, Part I, 573–81.

Evans, Oliver, *Oliver Evans to his Counsel, who are engaged in Defence of his Patent Rights. . . .* n.p. n.d.

Evans, Oliver, *Reply to Jefferson. Answer to the Baltimore Millers' Memorial and Thos. Jefferson's Letter.* n.p. n.d.

Evans, Oliver, *The Young Millwright and Miller's Guide.* 9th edition. Philadelphia, 1836.

Evans Patent. *Memorial to Congress of Sundry Citizens of the United States Praying Relief from the Oppressive Operation of Oliver Evans' Patents.* n.p. n.d.

Fernow, Berthold, *Documents Relating to the History of the Dutch and Swedish Settlements on the Delaware River.* (Documents relative to the Colonial History of the State of New York, Vol. 12.) Albany, 1877.

Force, Peter, *Tracts and Other Papers. . . .* 4 vols. Washington, 1836–46.

Jefferson, Thomas, *The Writings of Thomas Jefferson.* Edited by A. A. Lipscomb. 10 vols. Washington, 1905–07.

Morgan, R. C., and Shannon, W. A., *Statement of Prices of Flour.* House Ex. Doc. No. 10, pp. 83–88. Thirty-Fourth Congress, 1st Session, Vol. IV, 'Exhibiting the prices of flour in Boston, New York, Philadelphia, Baltimore, New Orleans and St. Louis annually from 1800 to June 30, 1855.' Washington, 1855.

National Society for the Promotion of Vocational Education, *Report of the Minneapolis Survey for Vocational Education.* Minneapolis, 1916.

Neill, E. D., *History of the Virginia Company of London,* with letters to and from the first colony never before printed. Albany, 1869.

Pitkin, Timothy, *A Statistical View of the Commerce of United States of America.* Hartford, 1816.

Proctor, R. G., Editor, *Tariff Laws,* 1789–1897.

Public Opinion, Vol. XXVIII, 298 ff. 'A Trust That Failed.' New York, 1899.

Ramsay, David, *The History of South Carolina.* Charleston, 1809.

Seybert, Adam, *Statistical Annals.* Philadelphia, 1818.

Taussig, F. W., Editor, *State Papers and Speeches on the Tariff.* Cambridge, 1893.

Tilghman, Wm., *An Address,* delivered before the Philadelphia Society for Promoting Agriculture. Philadelphia, 1820.

Walton, W., *An Essay,* proving iron far superior to stone of any kind for breaking and grinding corn, grain and pulse. West Lynn, Norfolk, 1788.

Washburn-Crosby Company, Working Agreement.

B. NON-PRIMARY

1. *Works on the Technique of Milling, Milling Methods and Products*

Amos, P. A., *Processes of Flour Manufacture.* New York, 1912.

Bailey, C. H., *The Chemistry of Wheat Flour.* New York, 1925.

Ball, C. R., and Clark, J. A., *Varieties of Hard Spring Wheat.* United States Department of Agriculture, Farmers' Bulletin No. 680.

Ball, C. R., Lighty, C. E., Stine, O. C., and Baker, O. E., Wheat Production and Marketing. *Yearbook of the Department of Agriculture,* 1922.

Bates, J. H., *The Miller's Guide Book.* Nashville, 1910.

Bellows, H. A., *A Short History of Flour Milling.* Minneapolis, 1924.

Brewer, W. H., Report on Cereal Production in the United States. United States Census of 1880, Vol. III (*Manufactures*), 371–553. Washington, 1883.

Brown, R. C., *The New Process Milling,* or Practical Suggestions on the Reconstruction of Mills. Elgin, Ill., 1877.

Buck, Norman, Improved Minnesota Flour. Department of Agriculture, *Annual Report* (1875), 388–90. Washington, 1875.

Carleton, Mark, Hard Wheats Winning their Way. *Yearbook of the Department of Agriculture* (1914), 391–420. Washington, 1920.

Carter, J. H., Modern Flour Milling. *Journal* of the Society of Arts, Vol. XXXIX (1890–91), 299–313.

Chapman, J. M., Financing the Marketing of Wheat. *Harvard Business Review,* Vol. III, 436–46; Vol. IV, 57–70. Cambridge, 1925.

Clark, J. A., Martin, J. H., and Ball, C. R., *Classification of American Wheat Varieties.* United States Department of Agriculture Bulletin No. 1074. Washington, 1922.

Coulter, J. L., The Wheat Crisis. *Quarterly Journal of the University of North Dakota,* Vol. XIII (1923), 6–23.

Dedrick, B. W., *Practical Milling.* Chicago, 1924.

Fredenhagen, A., *Practical Hints on Bolting and Preparing Middlings for the Purifier.* Warrensville, Ill., 1876.

Gray, W. D., A Quarter Century of Milling. In *The Northwestern Miller,* Vols. 48, 49. Minneapolis, 1898–99.

Grimshaw, Robert, *The Miller, Millwright and Mill-Furnisher. A Practical Treatise.* New York, 1882.

Hall, F. S., The Localization of Industry. United States Census of 1900. Vol. VII, pp. cxc ff. Washington, 1902.

Hughes, W. C., *The American Miller and Millwright's Assistant.* Philadelphia, 1852.

Humphries, O. E., Modern Developments of Flour Milling. *Journal of the Society of Arts,* Vol. 55, pp. 109–26 (1906–07).

Kozmin, P. A., *Flourmilling. A Theoretical and Practical Handbook.* . . . Translated by M. Falkner and Theodore Fjelstrup. New York, 1917.

Ladd, S. B., Patents in Relation to Manufactures. United States Census of 1900, Vol. X, 771 ff. Washington, 1902.

Lawson, P. V., The Inventor of the Roller Flour Mill. Wisconsin Historical Society, *Proceedings,* 1907, pp. 244–55. Madison, 1907.

Millar, Andrew, *Wheat and its Products.* London, 1916.

Morrison, C. B., Why Bleached Flour? *Bakers' Review,* May, 1922.

Neftel, Knight, Report on Flour Milling Processes. United States Census of 1880, Vol. III (*Manufactures*), 555–82. Washington, 1883.

Pallett, Henry, *The Miller's, Millwright's and Engineer's Guide.* Philadelphia, 1866.

Pearson, E. L., *Organization and Management in the Flour Milling Industry.* London, 1925.

Remington, J. S., *Science and the Miller.* London, 1914.

Salmon, Cecil, and Clark, J. A., *Durum Wheat.* United States Department of Agriculture, Farmers' Bulletin No. 534.

Shallenberger, J. H., and Clark, J. A., *Milling and Baking Experiments with American Wheat Varieties.* United States Department of Agriculture Bulletin No. 1183. Washington, 1924.

Stakman, E. C., The Black Stem Rust and the Barberry. *Yearbook* of the United States Department of Agriculture, 1919. Washington, 1919.

Warder, Wm., On the Manufacture of Flour, United States Department of Agriculture, *Annual Report,* 1862, pp. 423–29.

Wiley, H. W., Flouring and Grist-Mill Products. United States Census of 1900, Vol. IX, 355–71. Washington, 1902.

2. *Works on Economic and Local History and Descriptions of Trade Conditions*

Alsberg, Carl, *Combination in the American Bread-Baking Industry.* Food Research Institute Publications. Stanford University, 1926.

Andreas, A. T. (Publisher), *History of Chicago.* 3 vols. Chicago, 1866.

Atwater, Isaac, *History of the City of Minneapolis, Minn.* New York, 1893.

Barnett, G. E., The Present Position of American Trade Unionism. *American Economic Review,* Vol. XII (Supplement), 44–96 (1922).

Bell, H. C., The West India Trade before the American Revolution. *Magazine of History,* XXIII (1916), 232–40.

Bidwell, P. W., Rural Economy in New England at the Beginning of the Nineteenth Century. Connecticut Academy of Arts and Sciences, *Transactions,* XX (1916), 241–399.

Bidwell, P. W., and Falconer, J. I., *History of Agriculture in the Northern United States,* 1620–1860. Washington, 1925.

Bishop, J. L., *A History of American Manufactures* from 1608 to 1860. 3d edition. 3 vols. Philadelphia, 1868.

Blackman, F. W., *Kansas, A Cyclopædia of State History.* 2 vols. Chicago, 1912.

Bland, J. R., *A Review of the Commerce of the City of Baltimore.* Revised edition. Baltimore (*The Sun*) 1884(?).

Bolles, A. S., *Industrial History of the United States.* Norwich, Conn., 1879, 1881.

Bromley, E. A., The Old Government Mills at the Falls of St. Anthony. Minnesota Historical Society, *Collections,* X, Part 2, pp. 635–43. St. Paul, 1902.

Bruce, P. A., *Economic History of Virginia in the Century.* 2 vols. New York, 1896.

Carey, J. R., History of Duluth and of St. Louis County to the Year 1870. Minnesota Historical Society, *Collections,* Vol. IX, 241–78. St. Paul, 1901.

Carrier, Lyman, *Beginnings of Agriculture in America.* New York, 1923.

Case, T. S., *History of Kansas City.* Syracuse, 1888.

Castle, H. A., *Minnesota: Its Story and Biography,* Vol. III. Chicago, 1915.

Clark, V. S., *History of Manufactures in the United States, 1607–1860.* Washington, 1916.

Clement, Buffalo, *America's Gateway to and from the Great Northwest.* n.p. n.d.

Conrad, H. C., *History of the State of Delaware.* 3 vols. Wilmington, 1908.

Coulter, J. L., Industrial History of the Valley of the Red River of the North. *Collections of the State Historical Society of North Dakota,* Vol. III, 529–672.

DeBow, J. E. B., *Industrial Resources of the South and West,* Vol. I, 103 ff. Industries of Baltimore.

Dondlinger, P. T., *The Book of Wheat.* New York, 1908.

Douglas, R. L., A History of Manufactures in the Kansas District. Kansas State Historical Society, *Collections,* Vol. XI (1909–10), 81–215.

Edgar, W. C., *The Story of a Grain of Wheat.* New York, 1903.

Edgar, W. C., The Miller and His Mill. *Chautauquan,* November, 1892, pp. 169–73.

Edgar, W. C., *The Medal of Gold.* Minneapolis, 1925.

Eldred, Wilfred, Wheat and Flour Trade under the Food Administration. *Quarterly Journal of Economics,* Vol. XXX, 1–70 (1918).

Eldred, Wilfred, *The Story of the U.S. Grain Corporation.* Washington, 1920.

Evans, C. W., *Biographical and Historical Accounts of the Fox, Ellicott and Evans Families.* Buffalo, 1882.

Everts, Ensign, and Everts, *History of Monroe County, New York.* Philadelphia, 1877.

Ferris, Benjamin, *A History of the Original Settlements on the Delaware.* Wilmington, 1846.

Field, T. W., *Historic and Antiquarian Scenes in Brooklyn and its Vicinity.* Brooklyn, 1868.

Fieldhouse, W. R., *History of the Flour Milling Industry of Minneapolis.* MS. Master's Thesis, University of Minnesota.

Fish, H. C., and Black, R. M., *A Brief History of North Dakota.* New York, 1925.

Fite, E. D., The Agricultural Development of the West during the Civil War. *Quarterly Journal of Economics,* Vol. XX (1906), 259–78.

Fitz, L. A., The Development of the Milling Industry in Kansas. Kansas State Historical Society, *Collections,* Vol. XII (1910–11), 53–59.

Flint, C. L., A Hundred Years' Progress. *Report of the Commissioner of Agriculture*, 1872, pp. 274–304.

Fogarty, K. H., *The Story of Montana.* New York, Chicago, 1916.

Folwell, W. W., *Minnesota, the North Star State.* Boston, 1908.

Folwell, W. W., *History of Minnesota.* 3 vols. St. Paul, 1921–26.

Ford, H. A., and Ford, K. B., *History of Cincinnati.* Cleveland, 1881.

Freedley, E. T., *Philadelphia and its Manufactures in 1867.* Philadelphia, 1867.

Fuller, G. N., *Economic and Social Beginnings of Michigan*, 1805–37. Michigan Historical Publications, University Series, No. 1. Lansing, 1916.

Fuller, Grace, *An Introduction to the History of Connecticut as a Manufacturing State.* Smith College Studies in History, Vol. I, No. 1. Northampton, 1915.

Gabriel, R. H., *The Evolution of Long Island.* Yale Historical Publications.

Goodwin, F. P., *The Growth of Ohio.* University of Cincinnati Studies, Series II, Vol. II, No. 4. Cincinnati, 1906.

Goodwin, F. P., The Rise of Manufactures in the Miami Country. *American Historical Review*, Vol. XII (1907), 761 ff.

Goodwin, J. A., *The Pilgrim Republic.* Boston, 1888.

Goss, C. F., *Cincinnati the Queen City*, 1788–1912. 2 vols. Cincinnati, 1912.

Greeley, Horace, and others, *The Great Industries of the United States.* Hartford, 1872.

Hall, C. C., *Baltimore, Its History and Its People.* New York-Chicago, 1912.

Hanna, Mary, *Trade of the Delaware District before the Revolution.* Smith College Studies in History, Vol. II, No. 4. Northampton, 1917.

Harper's Weekly, June 14, 1913. The Duluth Board of Trade.

Hartsough, M. L., *The Development of the Twin Cities* (Minneapolis and St. Paul) *as a Metropolitan Market.* Minneapolis, 1925.

Hibbard, B. H., *Effects of the Great War upon Agriculture* in the United States and Great Britain. New York, 1919.

Howard, G. W., *The Monumental City, Its Past History and Present Prospects.* Baltimore, 1873.

Hudson, H. B., *A Half Century of Minneapolis.* Minneapolis, 1908.

Hudson, H. B., *The Minneapolis Chamber of Commerce; a Historical Sketch.* Minneapolis, 1903.

Illmer, E. V., and others, *The Industrial Survey of Baltimore.* Baltimore, 1914.

International Publishing Company (Publishers), *A Half Century's Progress of the City of Baltimore.* Baltimore, 1887.

Johnson, E. R., and others, *History of Domestic and Foreign Commerce of the United States.* 2 vols. Washington, 1915.

Kansas State Board of Agriculture, *Wheat in Kansas.* Topeka, 1921.

Kirkland, John, *Three Centuries of Prices of Wheat Flour and Bread.* London, 1917.

Kirkland, Joseph, *The Story of Chicago.* 2 vols. Chicago, 1892–94.

Lamphere, G. N., History of Wheat Raising in the Red River Valley. Minnesota Historical Society, *Collections,* Vol. X. St. Paul, 1905.

Land and Thompson (Publishers), *Richmond, Her Commercial and Manufacturing Advantages.* Richmond, 1884.

Larson, Henrietta, *The Wheat Market and the Farmer in Minnesota, 1858–1900.* Columbia University Studies, Vol. CXXII, No. 2. New York, 1926.

LeClerc, J. A., *International Trade in Wheat and Wheat Flour.* United States Department of Commerce, Trade Promotion Series, No. 10. Washington, 1925.

Lefferts, W., *Tidewater Maryland,* An Embayeo Coastal Plain. Philadelphia, 1918.

Lewis, H. T., and Miller, S. I., Editors, *Economic Resources of the Pacific Northwest.* Seattle, 1923.

Lippincott, Isaac, *History of Manufactures in the Ohio Valley to the Year 1860.* New York, 1914.

Lippincott, Isaac, *Internal Trade of the United States,* 1700–1800. Washington University Studies, Vol. IV, 63–150.

Litman, Simon, *Prices and Price-Control in Great Britain and the United States during the World War.* New York, 1920.

MacFarlane, J. J., *Manufacturing in Philadelphia*, 1863–1912. Philadelphia, 1912.

McHugh, J. G., *Modern Grain Exchanges*. Minneapolis, 1919.

McPherson, L. G., *Railroad Freight Rates in Relation to the Industry and Commerce of the United States*. New York, 1909.

Merk, Frederick, *Economic History of Wisconsin during the Civil War Decade*. Madison, 1916.

Meyer, H. R., *Government Regulation of Railroad Rates*. New York, 1905.

Miller, W. H., *History of Kansas City*. Kansas City, 1881.

Montgomery, E. G., *Productive Farm Crops*. Philadelphia, 1916.

Moody's Manual of Railroad and Corporation Securities.
1914. Industrial and Public Utility Section. New York, 1914.
1920. Industrials. New York, 1920.
1923. Industrials. New York, 1923.
1927. Industrials. New York, 1927.

Morrison, Andrew, Editor, *The City on the James*. Chamber of Commerce Handbook. Richmond, 1893.

Morriss, Margaret, *Colonial Trade of Maryland*. Johns Hopkins University Studies, Series 32, No. 3. Baltimore, 1914.

Munsell, Joel, *The Annals of Albany*. 10 vols. 2d edition. Albany, 1869 ff.

Munsell, Joel, *Collections on the History of Albany*. 4 vols. Albany, 1865–71.

Nelson, M. N., *Open Price Associations*. Urbana, 1923.

Nourse, E. G., *American Agriculture and the European Market*. New York, 1924.

O'Reilly, Henry, *Sketches of Rochester*. Rochester, 1838.

Peck, W. F., *Semi-Centennial History of Rochester*. Syracuse, 1884.

Pennsylvania Magazine, Vol. VIII, The Governor's Mill and the Globe Mills in Philadelphia.

Poindexter, Charles, *Richmond, Virginia: Her Advantages and Attractions*. n.p. n.d.

Refsell, O. N., The Farmers' Elevator Movement. *Journal of Political Economy*, Vol. XXII (1914), 872–95.

Reizenstein, M., *The Economic History of the Baltimore and Ohio Railroad*, 1827–53. Johns Hopkins University

Studies, 15th series, Vol. XV, Nos. 7–8. Baltimore, 1897.

Richmond Chamber of Commerce, *The Advantages of Richmond as a Manufacturing and Trading Center.* Richmond, 1882.

Ripley, W. Z., *Railroads: Rates and Regulation.* New York, 1913.

Robinson, E. V., *Early Economic Conditions and the Development of Agriculture in Minnesota.* University of Minnesota Studies in the Social Sciences, No. 3. Minneapolis, 1915.

Roe, J. W., *English and American Tool Builders.* New Haven, 1916.

Rogers, G. D., History of Flour Manufacture in Minnesota. Minnesota Historical Society, *Collections*, Vol. X, Part I, 35–55. St. Paul, 1905.

Rutter, F. R., *The South American Trade of Baltimore.* Johns Hopkins University Studies, 15th Series, No. 9, Vol. XV. Baltimore, 1897.

Rutter, W. P., *Wheat Growing in Canada, the United States and the Argentine*, including comparisons with other areas. London, 1911.

Scharf, J. T., *Chronicles of Baltimore.* Baltimore, 1874.

Scharf, J. T., *History of Delaware*, 1609–1888. 2 vols. Philadelphia, 1888.

Scharf, J. T., and Westcott, T., *History of Philadelphia*, 1609–1884. 3 vols. Philadelphia, 1884.

Schmidt, L. B., and Ross, E. D., *Readings in the Economic History of American Agriculture.* New York, 1925.

Sellers, John, *The Millbourne Mills Company.* Philadelphia, n.p. n.d.

Shaw, Albert, *Coöperation in the Northwest.* Johns Hopkins University Studies, 6th Series, Vol. VI. Baltimore, 1888.

Shutter, M. D., and McLain, J. S., *Progressive Men of Minnesota.* Minneapolis, 1897.

Smalley, E. V., The Flour Mills of Minneapolis. *Century*, May, 1886, pp. 37–47.

Smith, R. E., Minneapolis and the Northwest. *Harper's Weekly*, April 26, 1913.

Smith, R. E., *Wheat Fields and Markets of the World.* St. Louis, 1908.

Spencer, Edward, *A Sketch of the History of Manufactures in Maryland.* Baltimore, 1882.

Stanwood, Edward, *American Tariff Controversies*, 1903.

Sterling, R. E., Flour Milling in Kansas City. *The Kansas Citian*, August 31, 1920.

Taylor, A. E., *American Importations of Canadian Wheat*. Food Research Institute, Wheat Studies, Stanford University, 1926.

Thompson, J. G., *Rise and Decline of the Wheat Growing Industry in Wisconsin*. Madison, 1909.

Tryon, R. M., *Household Manufactures in the United States*, 1640–1860. Chicago, 1917.

Tunell, G. G., The Diversion of the Flour and Grain Traffic from the Great Lakes to the Railroads. *Journal of Political Economy*, Vol. V (1897), 340–75. Chicago, 1897.

Tyson, M., A Brief Account of the *Settlement of Ellicott's Mills*. Baltimore, 1870.

Virtue, G. O., The Coöperative Coopers of Minneapolis. *Quarterly Journal of Economics*, Vol. XIX (1905), 527–44.

Walker, P. F., *Industrial Development of Kansas*. Bulletin of the University of Kansas. Lawrence, 1922.

Watson, J. F., *Annals of Philadelphia and Pennsylvania*. Enlarged and Revised by W. P. Hazard. 3 vols. Philadelphia, 1879.

Weeden, W. B., *Economic and Social History of New England*, 1620–1789. Boston, 1891.

Weld, L. H. D., Marketing Agencies between Manufacturer and Jobber. *Quarterly Journal of Economics*, Vol. XXXI (1917), 571–99.

Williams, T. J. C., *Maryland: A Description of its Lands, Products and Industries*. Baltimore, 1906.

Wilson, J. G., *Memorial History of the City of New York from its First Settlement to the Year 1892*. 4 vols. New York, 1892.

Wolman, Leo, *Growth of American Trade Unions*, 1880–1923. New York, 1924.

Working, Holbrook, *The Decline in Per Capita Consumption of Flour in the United States*. Food Research Institute, Wheat Studies. Stanford University, 1926.

3. *Bibliographies*

Bibliography of Milling and Bread-Baking. *Northwestern Miller*, May 6, 1925, p. 565, and following numbers.

Food Research Institute Wheat Studies, *A Selected Biblio-*

graphy of Publications Relating to the World Wheat Situation. Stanford University, 1926.

Phillips, C. L., and Shallenberger, J. H., *Flour Milling and Bread Baking*. Agricultural Economics Bulletin No. 2 (mimeographed). United States Department of Agriculture, Bureau of Agricultural Economics. Washington, 1925.

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